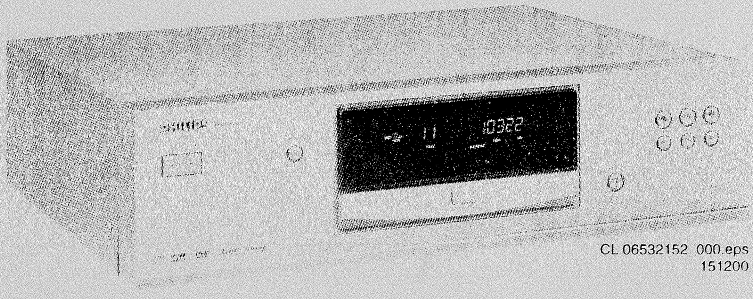
SERV. 9831

DVD-Video Player

SACD 1000
/001 /171 /691

Service
Service
Service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Service Manual

CLASS 1
LASER PRODUCT

SUPER AUDIO CD

DVD VIDEO

COMPACT disc DIGITAL VIDEO

COMPACT disc DIGITAL AUDIO

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PHILIPS

1. Technical specifications & connection facilities

1.1 General:

Mains voltage	: 120V (98 - 132V AC) for USA : 230V (198 -264V AC) for Europe/Asia : by means of voltage selector
Mains frequency	: 50 Hz - 60Hz
Power consumption mains	: < 36 W
Power consumption standby	: < 3 W (remote operatable)
Power off	: < 0.8W

1.2 Audio performance

1.2.1 Line output audio/video

Output voltage 2 channel mode	: 2Vrms ± 1.5dB
Output voltage 5.1 channel Dolby	: 1.41Vrms ± 1.5dB
Channel unbalance (1kHz)	: <0.85dB
Crosstalk 1kHz	: >105dB
Crosstalk 20Hz-20kHz	: > 95dB
Frequency response 20Hz- 20kHz	: ± 0.1dB max
Signal to noise ratio	: >100 dB
Dynamic range 1kHz	: >90dB
Dynamic range 20Hz-20kHz	: >88dB
Distortion and noise 1kHz	: >90dB
Distortion and noise20Hz-20kHz	: >80dB
Intermodulation distortion	: >87dB
Phase non linearity	: ± 1° max.
Level non linearity	: ± 0.5dB max.
Mute (spin-up, pause, access)	: >100dB
Outband attenuation:	: > 50dB above 25kHz

1.2.2 Line output 6 channel

DSD mode stereo +5.1 multi channel (SACD)

Output voltage (1 KHz)	: 2Vrms +/- 0.3V
Channel unbalance	: <0.5dB
Cut off frequency normal mode (-3dB)	: 40KHz +/- 5KHz
Cut off frequency custom mode (-3dB)	: 50KHz +/- 5KHz
Amplitude linearity (20Hz - 20KHz)	: +0.1/-1dB max normal mode : +0.1/-0.6 dB max custom mode
Phase linearity (20Hz - 20KHz)	: tbd
SNR dig. silence; normal mode 20KHz	: -111 dB (Typical) : >108dB
SNR dig. silence; normal mode A weighted	: -114 dB (Typical) : >111dB
SNR 1KHz, -160dB normal mode 500KHz	: -50dB (Typical) : >40dB
SNR 1KHz, -160dB custom mode 500KHz	: >40dB (Typical) : >30dB
THD 0dB 1KHz	: 98dB (Typical custom mode) : 95 dB (Typical normal mode)
THD 0dB 20Hz-20KHz	: >96dB (custom mode) : >90 dB (normal mode)
Dynamic range -60dB	: 114dB (Typical) : >108 dB
Intermodulation distorsion CCIF	: 108dB (Typical) : >102dB
Low level linearity (-60 to -90 dB)	: <0.5dB
Interchannel phase	: <1°
Crosstalk (20Hz-20KHz)	: 100dB (Typical) : >90dB

PCM mode up to 6 channels (DVD/ CDDA):

Output voltage (1 KHz)	: 2Vrms +/- 0.3V
Channel unbalance	: <0.5dB
Amplitude linearity (20Hz - 20KHz)	: +0.1/-0.6 dB max
Phase linearity (20Hz - 20KHz)	: tbd
SNR dig. silence; normal mode 20KHz	: >108dB
SNR dig. silence; normal mode A weighted	: >111dB
THD 0dB (1KHz)	: 95 dB typical
THD 0dB (20Hz-20KHz)	: >90dB
Dynamic range -60dB	: >108dB
Intermodulation distorsion CCIF	: 105dB (Typical) : >100dB
Low level linearity (-60 to -90 dB)	: <0.5 dB
Interchannel phase	: <1°
Crosstalk (20Hz-20KHz)	: 100dB (Typical) : >90dB

1.3 Video performance

1.3.1 CVBS

CVBS output loaded with 75 Ohm
Fully according PQR3 IMS

1.3.2 S-video (Y/C)

Fully according PQR3 IMS
Connector pinning

1 - GND		⏚
2 - GND		⏚
3 - Y	1Vpp ± 0.1V into 75 Ohm	
4 - C	burst 300mVpp +1/-4dB into 75 Ohm	

Aspect ratio switching by DC on C(pin4).
Connector type : 4 pin mini- DIN

1.4 SCART

Fully according PQR3 IMS
Connector implementation according EN50049-1; color = black; dual SCART
Fully according to prEN1057-2-1
Signal switching is P50 controlled; supported features of mode 3 see survey of applicable standards.

1.4.1 SCART II (connected to TV)

Pin signals:

1 - Audio R	1.8V RMS	○→
2 - Audio R		→○
3 - Audio L	1.8V RMS	○→
4 - Audio GND		⏚
5 - Blue/Chroma GND		⏚
6 - Audio L		→○
7 - Blue out/ Chroma in	0.7Vpp ± 0.1V into 75 Ohm (*)	▭→
8 - Function switch	<2V = TV >4.5V / <7V = asp. ratio 16:9 DVD >9.5V / <12V = asp. ratio 4:3 DVD	○→
9 - Green GND		⏚
10- P50 control		▭→
11- Green	0.7Vpp ± 0.1V into 75 Ohm (*)	▭→
12- Nc		
13- Red/Chroma GND		⏚
14- fast switch GND		⏚
15- Red out/ Chroma out	0.7Vpp ± 0.1V into 75 Ohm (*) ± 3dB 0.3Vpp Chroma (burst)	▭→
16- fast switch RGB/ CVBS	or Y <0.4V into 75 Ohm = CVBS >1V / <3V into 75 Ohm = RGB	○→
17- Y/CVBS GND		⏚
18- fast switching GND		⏚
19- CVBS/Y/RGB sync	1Vpp ± 0.1V into 75 Ohm (*)	○→
20- CVBS/Y		→▭
21- Shield		⏚

1.4.2 SCART I (connected to AUX)

Pin signals:

1 - Audio R	1.8V RMS	○→
2 - Audio R		→○
3 - Audio L	1.8V RMS	○→
4 - Audio GND		⏚
5 - Blue/Chroma GND		⏚
6 - Audio L		→○
7 - Blue in/ Chroma out	± 3dB 0.3Vpp Chroma (burst)	▭→
8 - Function switch		→○
9 - Green GND		⏚
10- P50 control		▭→
11- Green		→▭
12- Nc		
13- Red/Chroma GND		⏚
14- fast switch GND		⏚
15- Red in/ Chroma in		→▭
16- fast switch RGB/ CVBS or Y		→○
17- CVBS GND		⏚
18- fast switching GND		⏚
19- CVBS/Y/RGB sync	1Vpp ± 0.1V into 75 Ohm (*)	○→
20- CVBS/Y		→▭
21- Shield		⏚

(*) for 100% white

1.5 Digital output

1.5.1 Coaxial

CDDA/ LPCM (incl MPEG1)	: according IEC958
MPEG2, AC3 audio	: according IEC1937
DTS	: according IEC1937, amendment 1

Remark: DTS audio output mode is only available on 'digital out'

1.5.2 Optical

identical to coaxial

1.6 P50 SYSTEM CONTROL

Via SCART pin nr 10

1.7 Dimensions and weight

Place and height of feet	: acc. to Philips Harmonisation line
Apparatus tray closed	: WxDxH :435 x 330 x 110
Apparatus tray open	: WxDxH :435 x 470 x 110
Weight without packaging	: ca. 9.5 Kg
Weight in packaging	: ca. 13 Kg

1.8 Laser output power & wavelength

1.8.1 SACD/DVD

Output power	: 7mW
Wavelength	: 650nm

1.8.2 CD

Output power	: 10mW
Wavelength	: 785nm

2. Warnings, laser safety and service hints

2.1 Warning and laser safety

GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

ESD

NL WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise a leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller a ce que les composants ainsi que les outils que l'on utilise soient également a ce potentiel.

D WARNUNG

Alle IC und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unsorgfältige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
Sorgen sie dafür, das Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevita potrebbe essere fortemente ridatta in caso di non osservazione della piu grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

NL

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt terug gebracht en dat onderdelen, identiek aan de gespecifieerde worden toegepast.

D

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten.
Der Originalzustand des Gerats darf nicht verandert werden.
Fur Reparaturen sind Original-Ersatzteile zu verwenden.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambiago idetici a quelli specificati.

F

Les normes de sécurité exigent que l'appareil soit remis a l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

SHOCK, FIRE HAZARD SERVICE TEST:

CAUTION: After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom,
Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before return to user/customer.
Ref.UL Standard NO.1492.

NOTE ON SAFETY:

Symbol ⚠ : Fire or electrical shock hazard. Only original parts should be used to replace any part with symbol ⚠
Any other component substitution(other than original type), may increase risk or fire or electrical shock hazard.

Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne.

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LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.

LASER DEVICE UNIT

Type:	SemiconductorlaserGaAlAs
Wave length:	650 nm (DVD) 780 nm (VCD/CD)
Output Power:	7 mW (DVD) 10 mW (VCD/CD)
Beam divergence:	60 degree

CLASS 1
LASER PRODUCT

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURE OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

AVOID DIRECT EXPOSURE TO BEAM

WARNING

The use of optical instruments with this product will increase eye hazard.
Repair handling should take place as much as possible with a disc loaded inside the player

WARNING LOCATION: INSIDE ON LASER COVERSHIELD

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARNING SYNLIG OCH OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD BETRAKTA EJ STRÅLEN
VARO! AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN
DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

Warning for powersupply on position 1005

The primary side of the powersupply including the heatsink carries live mains voltage when the player is connected to the mains even when the player is swiched off !
This primary area is not shielded so it is possible to touch copper tracks and/or components when servicing the player. Service personnel have to take precautions to prevent touching this area or components in this area .
The primary side of the powersupply has been indicated with a lightning stroke and a stripe-marked printed on the printed wiring board

Note:
The screws on the mechanism of the ASD1 module (position 81 in on the exploded view drawing) may never be touched removed or re-adjusted.
Handle the ASD1 module with care when the unit has to be exchanged!
The mechanism of the ASD1 module is very sensative for dropping or shocks.

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2.2 Service hints

2.2.1 Switched Mode Power Supply 1004

This power supply unit is not repairable and must be exchanged completely in case of failure. A new power supply can be ordered with codenumber 3104 129 22150.

2.2.2 SACD module

This module can be repaired as follows:

1. The loader and DVD-M(echanism) is one assembly (VAL6011) item 81. This assembly is a not repairable unit and must be exchanged completely in case of failure. A new unit can be ordered with codenumber 9305 023 61101 (for Europe and Asia Pacific) and 9305 023 61102 (for USA).
2. The mono board has to be repaired down to component level. Repair handling of the monoboard requires a workshop with sophisticated desoldering tools.

2.2.3 Service positions

SACD module
See also dismantling instructions.
After demounting the DAC PCB 1005 and the dust bracket 241, it is possible to connect the PC connection and to demount the SACD module to service the MONO PCB. After remounting the DAC PCB, the SACD module can be placed on top of the DAC PCB, protected by an insulation plate.

MONO PCB

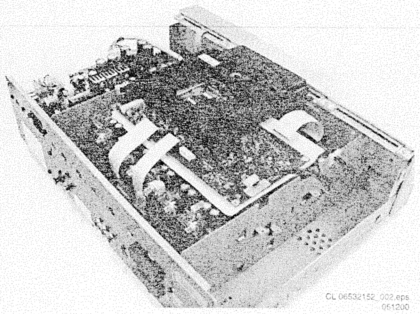
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Figure 2-1

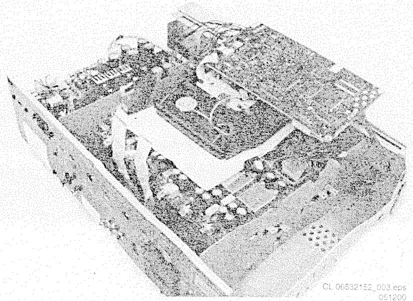
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Figure 2-2

DAC PCB

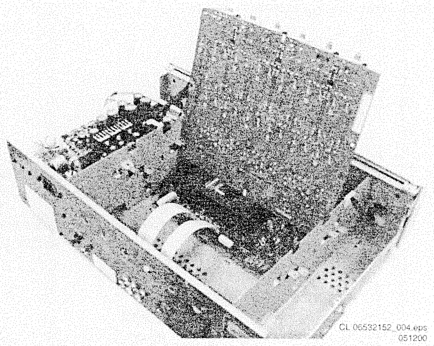
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Figure 2-3

AV PCB

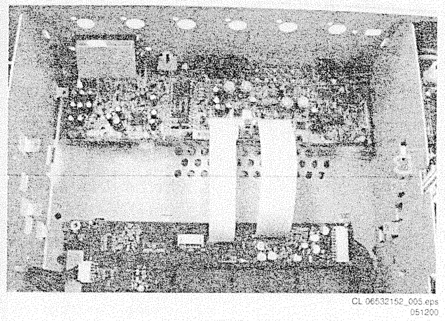
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Figure 2-4

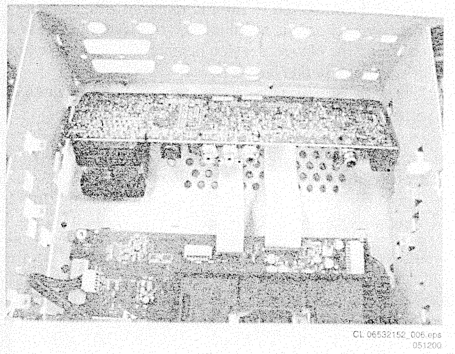
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Figure 2-5

Functional overview

Front of player

POWER ON/OFF
- switches the player on/off

Standby indicator
- lights up red when the player is in Standby mode

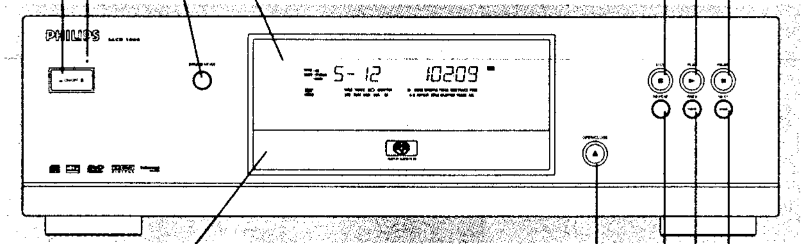
SOUND MODE
selects required sound mode:
- for SACD: CD, Stereo or Multi-channel (if available)
- for DVD/VCD: Stereo, Dolby Surround, 3D Sound or Multi-channel

Display
- displays the current status of the player

II PAUSE
- interrupts audio/video play or steps to the next picture frame

▶ PLAY
- starts audio/video play

■ STOP
- stops audio/video play



Disc loading tray

▲ OPEN/CLOSE
- opens/closes the disc tray

REPEAT

|◀◀ PREV
- selects previous track/title/chapter/index or beginning of current track/title/chapter/index

▶▶| NEXT
- selects next track/title/chapter/index

Rear of player

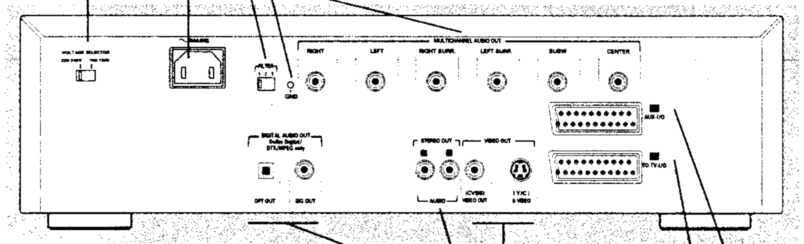
VOLTAGE SELECT(or)
- For selecting 100/120V or 220/240V. If necessary, adjust the selector to match with your local mains supply

MAINS
- Power supply socket for connection to the mains

Filter switch
- See chapter 'Operation - Enhanced use'

GND
- Ground connector. For making grounding connection between the various components of your system in case of disturbance problems. Also see 'System grounding' of chapter 'Operation - Enhanced use'

MULTI-CHANNEL AUDIO OUT
(For connection to a multi-channel receiver)
- SUBW(oofer) - subwoofer connection
- CENTER - center speaker connection
- RIGHT/LEFT SURR(ound) - surround speaker connections
- RIGHT/LEFT - front speaker connections



DIGITAL AUDIO OUT
- OPT(ical) OUT digital audio output connector for connection to digital (optical) equipment
- DIG(ital) OUT digital audio output connector for connection to digital (coaxial) equipment

STEREO OUT
- Audio outputs for connection to an amplifier, receiver or stereo system

VIDEO OUT
- VIDEO OUT (CVBS) - for connection to a TV with CVBS video inputs
- S-VIDEO OUT (Y/C) - for connection to a TV with S-Video (Y/C) inputs

TO TV-I/O
- Euroconnector for connection to a TV with Euroconnector

AUX-I/O
- Euroconnector for connection to your VCR

Caution: Do not touch the inner pins of rear panel connectors. Electrostatic discharge may cause permanent damage to the unit.

Display

SACD Super Audio CD inserted

CD Audio CD inserted

SVCD Super Video CD inserted

VCD Video CD inserted

•CD

•STEREO indicate the current active sound mode

•MCH

DVD VIDEO DVD video disc inserted

- number of titles on DVD in Stop mode
- number of current title

Number of current chapter

- number of tracks on SACD/CD/VCD in Stop mode
- number of current track

12:09
TRACK TIME

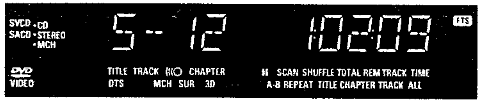
track time in hours, minutes and seconds

1 12:09
TOTAL
TIME

disc/program time in hours, minutes and seconds

REM TIME

remaining track time in hours, minutes and seconds when Display mode is set to Remaining time


SVCD •CD
SACD •STEREO
•MCH
DVD
VIDEO
5 -- 12
1:02:09
FTS
TITLE TRACK CHAPTER
DTS MCH SUR 3D
SCAN SHUFFLE TOTAL REM TRACK TIME
A-B REPEAT TITLE CHAPTER TRACK ALL

II playback temporarily interrupted (not active when setting Personal Preferences)

SCAN first 10 seconds of each track/chapter are played

A-B REPEAT A passage (A-B) is being repeated

SHUFFLE tracks/chapters are played in random order

REPEAT TITLE CHAPTER TRACK ALL repeat Title/Chapter/Track/All active

FTS FTS (Favourite track selection) program available for CD/DVD/VCD/SVCD inserted

remote control active (flashing)

DTS DTS (Digital Theatre Sound) audio on the digital output

MCH Sound mode button (for DVD) is set to Multi-channel

SUR Sound mode button (for DVD/VCD) is set to Dolby Surround

3D Sound mode button (for DVD/VCD) is set to 3D Sound

Remote control

TV POWER
- switches the TV to power/standby

■ STOP
- stops playback

SOUND MODE
- selects required sound mode
  - for SACD: CD, Stereo or Multi-channel (if available)
  - for DVD/VCD: Stereo, Dolby Surround, 3D sound or Multi-channel

▶ PLAY
- starts audio/video play

◀◀ REVERSE
- search backward

II PAUSE
- pause or still frame/step frame

▷ SLOW
- slow motion

▶▶ FORWARD
- search forward

◀ PREVIOUS
- previous track/title/chapter/index

I▸ RESUME
- resumes playback

▶ NEXT
- next track/title/chapter/index

VOL +/–
- volume up/down in TV mode

MUTE
- mutes the sound in TV mode

CH +/–
- program up/down in TV mode

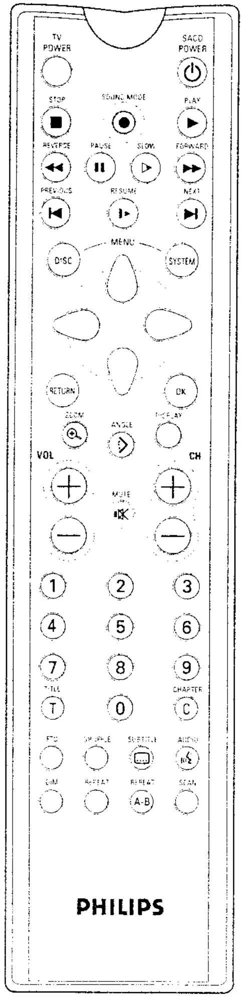
FTS
- switches FTS function ON/OFF
- displays FTS menu

(FTS = Favourite Track Selection)

SHUFFLE
- playback in random order

SUBTITLE
- subtitle ON/OFF/selects subtitles (DVD/VCD/SVCD only)

AUDIO
- language selection


TV POWER
SACD POWER
STOP
SOUND MODE
PLAY
REVERSE
PAUSE
SLOW
FORWARD
PREVIOUS
RESUME
NEXT
MENU
DISC
SYSTEM
RETURN
OK
ZOOM
ANGLE
DISPLAY
VOL
CH
MUTE
1
2
3
4
5
6
7
8
9
TITLE
T
0
CHAPTER
C
FTS
SHUFFLE
SUBTITLE
AUDIO
DIM
REPEAT
REPEAT
A-B
SCAN
PHILIPS

SACD POWER ⏻
- switches the player to power/standby

MENU DISC
- selects DVD-defined menu

MENU SYSTEM
- On-screen Display ON/OFF

△ ▽ ◁ ▷
- up/down/left/right cursor movement in OSD mode

RETURN
- return to previous menu step

ZOOM
- enlarges video image

ANGLE
- selects DVD camera angle

DISPLAY
- selects elapsed Time display or Remaining Time display

OK
- acknowledge menu selection

0-9
- numerical key pad

T
- selects titles

C
- selects chapters

PLAYER DISPLAY DIM
- adjusts display brightness

REPEAT
- repeats a track or complete disc (CD, VCD, SACD)
- repeats a chapter, title or complete disc (DVD)

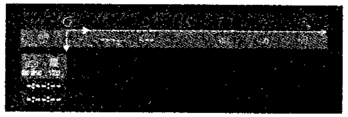
REPEAT A-B
- repeats a particular passage (A-B)

SCAN
- playback of the first 10 seconds of each track, chapter, title

On screen display information

Menu bar/Status window

User preference
Track/Title
Chapter
Subtitle language
Angle
Zoom
Colour
✓ Video FTS
Sound
Picture by Picture
Slow motion
Fast motion
Time search
Audio language
Sound Mode



Status window icons

The status window displays the current status of the player and is displayed together with the first part of the menu bar, if activated in the Features menu (see Personal Preferences).

General

no disc DVD VCD error — Disc type

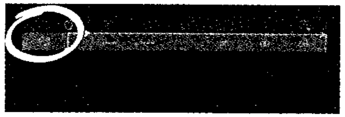
opening opening opening opened closing closing closing locked — Tray status

Default screen

The default screen is displayed when the player is in STOP mode.
It may contain a status window (see 'Status Window') and a 'Temporary Feedback Field'. Giving information concerning prohibited actions, playback modes, available angles, etc.

Temporary Feedback Field icons

scan	Scan
repeat	Repeat All
title	Repeat Title
track	Repeat Track
chapter	Repeat Chapter
shuffle	Shuffle
shuffle	Shuffle Repeat
A	Repeat A to end
A-B	Repeat A-B
	Current camera angle/number of available camera angles
locked	Child Lock On
safe	Child Safe
resume	Resume
	Action prohibited



Preparation

General notes

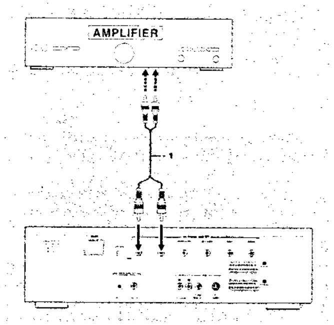
- Depending on your amplifier/receiver/Stereo System there are various ways you could connect the player. These are explained in the chapter below.
- For some connections settings for digital and/or analog output are required. These settings have to be made in the 'Personal Preferences' menu which is only accessible via your TV screen. In these cases you will need to connect the player to the TV as well.
- Please refer to your amplifier/receiver/Stereo System, TV and any other User Manual(s) as necessary to make the optimal connections.

Caution: Do not connect the player's audio output to the phono input of your audio system.

Connecting to audio equipment - analog

Connecting to an amplifier/receiver equipped with two channel analog stereo

● Connect the audio Left and Right outputs for Front speaker connection ***(1)*** to the corresponding sockets on your amplifier, receiver or stereo system. For this use the audio cable supplied.

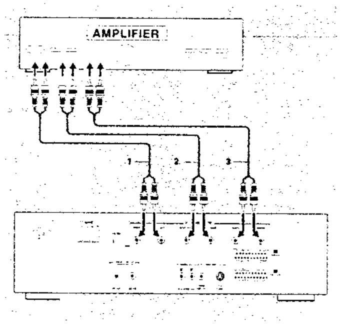


Connecting to a Multi-channel Audio/(Video) receiver with 6 connectors

This SACD player contains a multi-channel decoder. This enables playback of SACDs recorded in Multi-channel. You only need to select Multi-channel using the Sound Mode key.

1 Connect the audio Left and Right outputs for Front speaker connection ***(1)*** to the corresponding input sockets on your receiver. For this use the audio cable supplied.
2 Connect the audio Left and Right outputs for Surround speaker connection ***(2)*** to the corresponding inputs on your receiver. For this use an optional audio cable.
3 Connect the audio outputs for Center speaker and Subwoofer connection ***(3)*** to the corresponding inputs on your receiver. For this use an optional audio cable.

Note: If the subwoofer is equipped with its own amplifier, the Subwoofer connection should be connected to the subwoofer directly.



Connecting to an amplifier/receiver equipped with Dolby Pro Logic

For an amplifier/receiver with Dolby Surround, you may connect your SACD player in the same way as described for Dolby Pro Logic.

Dolby Pro Logic sound

1 Connect the audio Left and Right outputs for Front speaker connection ***(1)*** to the corresponding inputs on the Dolby Pro Logic Audio/Video amplifier/receiver, using the audio cable supplied.
2 Set Analog Output to Dolby Surround in the 'Personal Preferences' menu.

If your amplifier/receiver is equipped with a Dolby Digital decoder

- Connect the player as described in chapter 'Connecting to an Audio/(Video) receiver with multi channel decoder'.

If you connect the player to a TV equipped with a Dolby Pro Logic decoder

- Connect the player to the TV as described in chapter 'Connecting to a TV'.

Connecting to audio equipment - digital

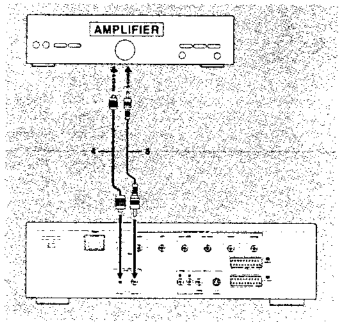
The digital output of the SACD1000 does not provide PCM (Pulse Code Modulation) signals. If your amplifer/receiver can decode only PCM and no multi-channel signals such as Dolby Digital, do not connect your SACD player via the digital input. This could damage your amplifier and/or speakers.

Connecting to an Audio/(Video) receiver with multi-channel decoder (Dolby Digital, MPEG 2 and DTS)

Digital Multi-channel sound (not for SACD)

For this you need a multi-channel A/V receiver that supports one or more of the DVD audio formats supported by your SACD player (MPEG 2, Dolby Digital and DTS). For this you can check the receiver manual and the logos on the front of the receiver.

1 Connect the player's digital audio output (optical ***4*** or coaxial ***5***) to the corresponding input on the receiver. For this use the digital audio cable (coaxial) is supplied. Optical is optional.
2 Set Digital Output to ALL in the 'Personal Preferences' menu.



Notes:
- If the audio format of the digital output does not match the capabilities of your receiver, the receiver will produce a strong, distorted sound. The audio format of the DVD disc in play is displayed in the Status Window, when changing the audio format.
- 6 Channel Digital Surround Sound via digital connection can only be obtained if your receiver is equipped with a Digital Multi-channel decoder. If your receiver does not contain a decoder, you can make the analog connections as described in chapter 'Connecting to a Multi-channel Audio/(Video) receiver with 6 connectors' to obtain 6 Channel Digital Surround Sound.
- SACD Multi-channel sound cannot be obtained via digital connection.

Connecting to a TV

Notes
- Depending on your TV there are various ways you could connect the player. These are shown in the illustration below.
- Please refer to your TV, VCR, and any other User Manual(s) as necessary to make the optimal connections.
- Do not connect your SACD-player via your VCR, because the video quality could be distorted by the copy protection system.

1 Connect the Euroconnector (TO TV-I/O ***6***) to the corresponding connector on the TV using the Euroconnector cable supplied.

If your TV is not equipped with a Euroconnector you can select one of the following alternative connections:

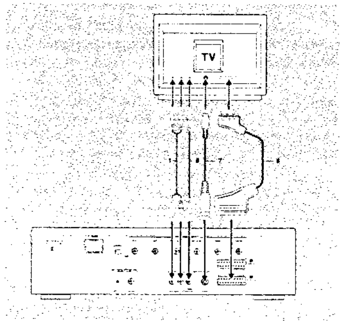
S-Video (Y/C) connection

1 Connect the S-VIDEO OUT (Y/C) socket ***(7)*** to the corresponding socket on the TV using an optional S-Video cable.

- If you wish to receive the sound via your TV connect the STEREO OUT Left and Right output sockets ***(1)*** to the corresponding sockets on the TV using the audio cable supplied.

Video CVBS connection

1 Connect the VIDEO OUT (CVBS) socket ***(8)*** to the corresponding socket on the TV using the video cable supplied.
2 If you wish to receive the sound via your TV connect the STEREO OUT Left and Right output sockets ***(1)*** to the corresponding sockets on the TV using the audio cable supplied.



6 Channel settings - DVD only

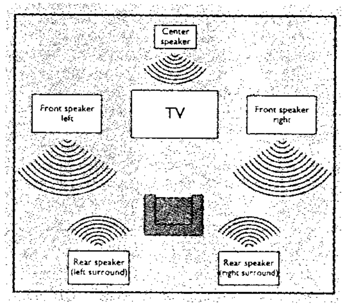
Front speaker
L (Large) : When the front speakers can reproduce low frequency signals below 120Hz
S (Small) : When the front speakers cannot produce low frequency signals below 120Hz

Center Speaker*
L (Large) : When the center speaker can reproduce low frequency signals below 120Hz
S (Small) : When the center speaker cannot produce low frequency signals below 120Hz
Off : When the center speaker is not connected

Surround speakers
L (Large) : When the surround speakers can reproduce low frequency signals below 120Hz
S (Small) : When the surround speakers cannot produce low frequency signals below 120Hz
Off : When the surround speakers are not connected

Subwoofer
On : When you connect a subwoofer
Off : When a subwoofer is not connected

** You can use your TV as center speaker. Please refer to your TV User Manual to check if your TV can reproduce low frequency signals below 120Hz. If not, set Center Speaker to S(small). When Center Speaker is selected in the 'Personal Preferences' menu, the sound from both center speaker and audio L/R as well as the audio from the Euroconnector will contain the center speaker audio.*

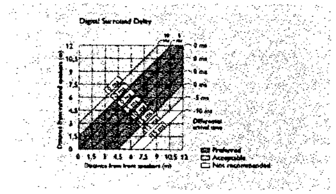


Delay times - DVD only

Your SACD player is set to reproduce correctly synchronized Digital Surround Sound in a listening area where the surround speakers are about 150cm nearer to the listening position than the front speakers, and the center speaker is in line with the front speakers. To adjust for other listening area arrangements, adapt delay times according to the following:

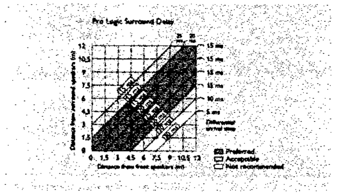
Digital Surround

Measure the distances in centimeters from the front speaker plane and from the surround speaker plane to the listening positioning plane.
Subtract the surround distance from the front distance and divide by 30. The result is the required Surround Channel delay time in milliseconds.
If the center speaker is on the front speaker plane, no center speaker delay is needed. You can adjust the delay time in the "User Preference Settings". See Personal preference - Sound - Speaker Settings. If, however, it is nearer the listening position, measure the distance in centimeters between the front and center speaker planes, and divide by 30. The result is the required Center Channel delay time in milliseconds.



Dolby Pro Logic

If the delay times for Surround Channel and Center Channel are set for Digital Surround mode, the delay times for Dolby Pro Logic mode will automatically be calculated and set.

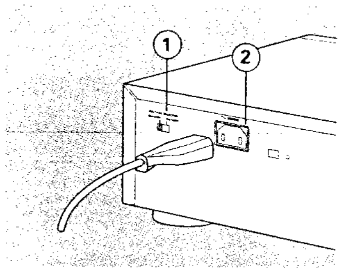


Connecting the power supply

1 Check if the mains voltage as shown on the type plate (on the back of the player) corresponds to your local mains voltage. If not, adjust the voltage selector *(1)* to match with your local mains supply.
2 Plug the female end of the power cable supplied into the Power connector MAINS *(2)* on the rear of the player.
3 Plug the male end of the cord into an AC outlet.

Note: When the player is in the STANDBY or OFF position, it is still consuming some power. If you wish to disconnect your player completely from the mains, withdraw the plug from the AC Outlet.

Caution: Only qualified service personnel should remove the cover or attempt to service this device.

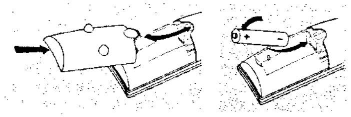


Infra red remote control

Loading the batteries

1 Open the battery compartment cover.
2 Insert two 'AA' (LR-6) batteries as indicated inside the battery compartment.
3 Close the cover.

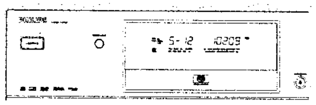
Caution: Do not mix old and new batteries. And never mix different types of batteries (standard, alkaline, etc.)



Remote control device code

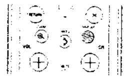
To operate the player via the remote control without response of a second DVD player, you can program both player and remote control to use a second set of remote control codes.
The default system code is Code 1.

Programming the player to respond to Code 2



1 Press **ON/OFF** to switch off the player.
2 Press for 3 seconds simultaneously press **SOUND MODE** and ▲ **OPEN/CLOSE** on the player and press **ON/OFF** to switch the player on again.
➤ The player will now be programmed to respond to Code 2.
➤ When step 1 and 2 are repeated the system code is set to Code 1 again.

Selecting the remote control code



- Simultaneously press **DISPLAY** and 1 or 2 on the remote control to select code 1 or 2.
➤ The remote control will now be set to the remote control code of your choice.
➤ This action can be repeated whenever necessary.

Operation

General explication

About this manual

This manual gives the basic instructions for operating this SACD player.
When playing DVD discs the player may not respond to all operating commands. Some DVD discs are produced in a way that requires specific operation or allows only limited operation during playback. When this occurs, please refer to the instructions in the disc inlay. When a ⛔ appears on the TV screen, the operation is not permitted by the player or the disc.

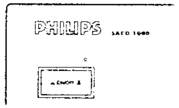
Remote control operation

- Unless otherwise stated, all operations can be carried out with the remote control. Always point the remote control directly at the player, making sure there are no obstructions in the path of the infrared beam.
- When there are corresponding keys on the front panel, they can also be used.

Menu bar operation

- A number of operations can also be carried out via the menu bar on the screen. The menu bar can be called up by pressing any of the following keys on the remote control: MENU SYSTEM, T, C, Angle, Audio Language, Subtitle Language, Zoom and FTS.
- The following functions can be operated via the menu bar:
  - Personal Preferences;
  - Track/title selection;
  - Chapter selection;
  - Audio language selection;
  - Subtitle language selection;
  - Angle selection;
  - Zoom;
  - Colour selection;
  - Video FTS selection;
  - Sound mode;
  - Picture by picture;
  - Slow motion;
  - Fast motion;
  - Time search.
- The various items can be selected with the < > (left/right cursor) keys or by pressing the relevant keys on the remote control.
- By pressing **MENU SYSTEM** the menu bar will disappear from the screen.
- When selecting an item in the menu bar, the selected item will be highlighted and the cursor keys (on the remote control), to operate this item are displayed below the icon.
- < or > indicates that more items are available at the left/right hand side of the menu bar. Press < > (left/right cursor) to select these items.

Switching on

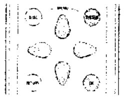


1 If necessary, switch on the TV and select the video input for your SACD player.
2 Press **ON/OFF** on the player front panel or **STANDBY** on the remote control.
➤ The player display lights up.
➤ If the player is connected to the TV the start up screen appears.

Personal preferences

In this mode you can set your personal preferences for a number of player features. Some settings however must be made. This depends on the type of audio equipment connected. For this see 'Connecting to audio equipment'.

General operation

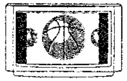


- ● Press **MENU SYSTEM** on the remote control.
- ● Select in the menu bar and press ▽ (down cursor).
  ➤ The Personal Preferences menu appears.
- ● Use the < > △ ▽ (left/right/up/down) keys to toggle through the menus, sub menus and submenu options.
  ➤ When a menu item is selected, the cursor keys (on the remote control) to operate the item are displayed next to the item.
- ● Press **OK** to confirm and return to the main menu.

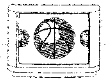
The following items can be adapted:

Picture

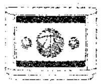
TV Shape
If you have a wide screen (16:9) TV, select 16:9.
If you have a regular (4:3) TV, select 4:3.
In this case you can also select between:
Letterbox for a 'wide-screen' picture with black bars top and bottom, or Pan Scan, for a full-height picture with the sides trimmed. Provided this is available on the disc in play. If a disc has Pan Scan, the picture then moves (scans) horizontally to keep the main action on the screen.



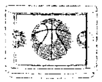
VIEWING ON 16:9



VIEWING ON 4:3



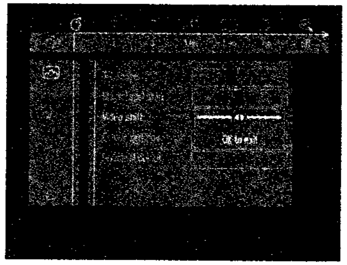
LETTERBOX



PAN SCAN

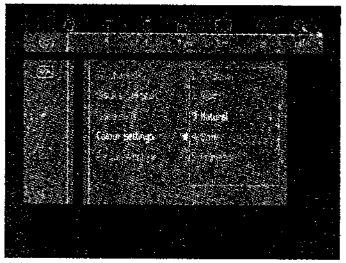
Black level shift (NTSC only)
Adapts the colour dynamics to obtain richer contrasts.
Select ON or OFF.

Video shift
Factory setting is such that the video will be centered on your screen. Use this setting to personalize the position of the picture on your TV by scrolling it to the left or right.



Video shift
OK to exit

Colour settings
(only when connected via Euroconnector)
You can select one of four predefined sets of colour settings and one set (Personal) which you can define yourself.



Colour settings
Natural

Personal colour
(only when connected via Euroconnector)
Allows you to fine-tune the selected colour settings saturation, brightness and contrast.

Sound

Analog output
Select Stereo, Dolby Surround, 3D Sound or Multi-channel. See 'Digital and Analog output Settings for DVD/VCD'. Factory setting is Multi-channel.

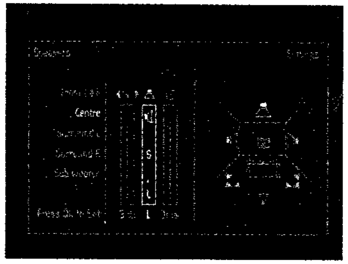
Dolby Surround : Select this setting when using equipment with a Dolby Surround Pro Logic decoder. In this setting the 5.1 audio channels (Dolby Digital, MPEG-2) are downmixed to a Dolby Surround compatible 2-channel output.

3D-Sound : In a setup without rear speakers (analog stereo output), 3D Sound remixes the six channels of digital surround into a two speaker output, while retaining all of the original audio information. The result is the listening sensation of being surrounded by multiple speakers.

Multi-channel : Select this setting when using a multi-channel audio/(video) receiver with six inputs. In this mode, the player will perform Dolby Digital 5.1-channel decoding when applicable, and Dolby Pro Logic decoding on DVD-Video and (Super) Video-CD discs with 2-channel soundtracks. No Dolby Pro Logic decoding is done with (Super) Audio CD discs.

Night Mode
Optimizes the dynamics of the sound with low volume playback. This setting can only be used with discs that support the Night Mode feature.

Speaker settings
Allows you to select speaker settings, volume balance and delay time and to test the speaker settings. Speaker settings are only active on the Multi-channel Audio Out Outputs. Speaker settings will not be used during playback in SACD Stereo or Multi-channel Sound Mode.



Karaoke vocal
Put this setting to ON only when a multi-channel karaoke DVD is being played. The karaoke channels on the disc will then be mixed to a normal stereo sound.

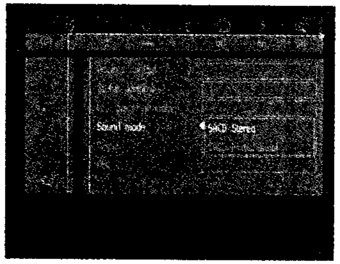
Language

Select the required Menu, Audio and Subtitle language.
Menu language - The On Screen Menus will be displayed in the language you choose. You can choose from 8 different languages.
Audio language - The sound as well as the DVD disc menu will be in the language you choose provided this is available on the disc in play. If not, speech will revert to the first spoken language on the disc. You can choose from 16 different languages.
Subtitle language - The subtitles will be in the language you choose provided this is available on the disc in play. If not, subtitles will revert to the first subtitle language on the disc. You can choose from 16 different languages.

Audio language and Subtitle language can also be adapted via the Menu bar on the screen.

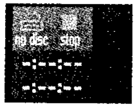
Features

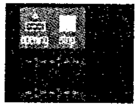
Sound Mode (SACD only)
Selection of default SACD Sound Mode: Stereo or Multi-channel. Sound Mode setting can be changed during playback with the Sound Mode button on the player or the remote control. When selecting Multi-channel make sure your sound mode is set up for Multi-channel reproduction.


Sound mode ◀ SACD Stereo

Access Control (DVD/VCD/SVCD only)
Access Control contains the following features:
Disc Lock - When Disc Lock is set to ON, a 4-digit PIN code needs to be entered in order to play discs.
Parental control - Allows the conditional presentation of DVD discs containing Parental Control information.

Status Window
Displays the current status of the player and is displayed together with the menu bar. In STOP mode it is displayed together with the 'Temporary Feedback' Field in the default screen. See 'On Screen Display information; Factory setting is ON. Select OFF to suppress display of the Status Window.



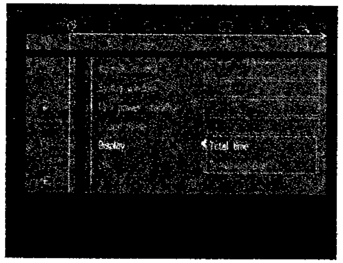


Low Power Standby
If this setting is set to ON, the player will go in low-power standby when the Standby button (remote control) is pressed. While in low-power standby, scart AUX-I/O will no longer be available. All external apparatus connected to it will be ignored.

PBC
This feature allows you to disable or enable the PBC (Playback Control) menu of VCD discs. See under 'Special VCD features': Factory settings is ON

Display information

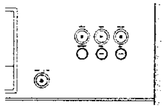
Display
Elapsed time - during playback the elapsed playing time will be displayed.
Remaining time – during playback the remaining playing time will be displayed.
Display setting can be changed during playback with the **DISPLAY** button on the remote control.


Display ◀ Total time

Player Display Dim (via remote control)
This feature allows you to set the display brightness.
By repeatedly pressing the **DIM** button on the remote control you can select: normal brightness, half brightness and blank display.

Operation - Audio (Super Audio CD and CD)

Loading a SACD or Audio disc



1 Press ▲ **OPEN/CLOSE** on the front of the player. The disc loading tray opens.
2 Lay the disc in the tray, label side up. Make sure it is sitting properly in the correct recess.
3 Gently push the tray, or press ▲ **OPEN/CLOSE**, to close the tray.
➤ READING appears on the player display and in the status window (if TV is on).

If a Super Audio CD is inserted the Sound Modes available on the disc will be shown on the player display. The current Sound Mode is indicated on both player display (with a bullet) and screen (if TV is on).

Playing a SACD or Audio disc

SUPER AUDIO CD
COMPACT
disc
DIGITAL AUDIO

- Press ▶ **PLAY** to start playback.
  ➤ During playback of Super Audio CDs and audio discs all functions can be operated via the buttons on the remote control and the player front.
  ➤ If the TV is on, the Super Audio CD or the Audio CD screen appears.
  ➤ During play, the current track number and its elapsed playing time will be shown on the player display (and on the screen). If a default Display Time setting (Total Time/Remaining Time) is made in the Personal Preferences menu this will be shown during playback. With the **DISPLAY** button on the remote control other time indications can be selected.
  ➤ When playing a Super Audio CD the currently selected Sound mode will be indicated on the display with a bullet.
  ➤ At the beginning of each track the number of front channels and surround channels will be displayed (e.g. 3/2). If a subwoofer channel is present this will also be displayed (+1).

➤ If a default Sound mode (Stereo/Multi-channel) is selected in the Personal Preferences menu and this Sound mode is not availabale on the disc inserted, playback will start in the first available Sound mode on the disc.
➤ Playback will stop at the end of the disc.

- To stop play at any other time, press ■ **STOP**.
  ➤ The number of tracks and the total playing time will be shown on the player display (and on the screen).

Sound mode - SACD playblack

- Press **SOUND MODE** on the player or the remote control to select the required Sound mode:
  Stereo - Super Audio Stereo reproduction.
  Multi-channel - Super Audio Multi-channel reproduction.
  CD - normal CD stereo reproduction (press ■ **STOP** first, then press **SOUND MODE**).

The sound modes available on the disc are indicated on the display. When selecting Multi-channel make sure your speaker configuration is set up for Multi-channel reproduction.

Pause

- Press **II PAUSE** during play.
- To return to play, press ▶ **PLAY**.

Search

- To search forwards or backwards through the disc at 4x normal speed, press ◀◀ **REVERSE** or ▶▶ **FORWARD** during play.
  ➤ Search begins, and sound is muted.
- To step up to 8x normal speed, press ◀◀ **REVERSE** or ▶▶ **FORWARD** again.
  ➤ Search goes to 8x speed.
- To return to 4x normal speed, press ◀◀ **REVERSE** or ▶▶ **FORWARD** again.
- If the TV is on, search speed and direction are indicated on the screen each time ◀◀ **REVERSE** or ▶▶ **FORWARD** is pressed.
- To end the search, press ▶ **PLAY** or ■ **STOP** as desired.
  ➤ Sound muted in 4x and 8x search.

Moving to another track

- Press ▶| **NEXT** briefly during play to step forward to the next track.
- Press |◀ **PREVIOUS** briefly during play to return to the beginning of the current track. Press |◀ **PREVIOUS** briefly again to step back to the previous track.
- To go directly to any track, enter the track number using the numerical keys **0-9**.

Shuffle

- Press **SHUFFLE** during play.
  ➤ The order of the tracks is changed.
- To return to normal play, press **SHUFFLE** again.

Repeat track/disc

- To repeat the currently playing track, press **REPEAT**.
  ➤ REPEAT TRACK appears on the display.
- To repeat the entire disc, press **REPEAT** a second time.
  ➤ REPEAT ALL appears on the display.
- To exit Repeat mode, press **REPEAT** a third time.

Repeat A-B

To repeat or loop a sequence:

- Press **REPEAT A-B** at your chosen starting point.
  ➤ A appears on the player display.
- Press **REPEAT A-B** again at your chosen end point.
  ➤ A-B appears on the display, and the repeat sequence begins.
- To exit the sequence, press **REPEAT A-B** again.

Scan

Plays the first 10 seconds of each track on the disc.

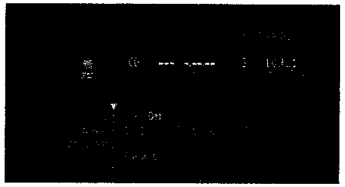
- Press **SCAN**.
- To continue play at your chosen track, press **SCAN** again or press ▶ **PLAY**.

FTS (Favourite Track Selection) - Audio CD only

- The FTS feature allows you to store your favourite tracks for a particular disc in the player memory.
- Each FTS program can contain 20 tracks.
- Each time an FTS program is played it will be placed on top of the list. When the list is full and a new program is added, the last program in the list will be removed from the list.
- The selections can be called up and played at any time.
- For storing an FTS program On Screen Display operation is required.

Storing an FTS-program

1 Load a disc and go to Stop mode.



2 Use ▽ (down cursor) to go to the list of available tracks.
3 Use ◁ and ▷ (left/right cursor) to select tracks from the list.
To go directly to any track, enter the track number using the numerical keys **0-9**.
4 Store each track by pressing **OK**.
➤ The track numbers will be added to the list of selected tracks.
➤ The number of tracks and the playing time of the program will be shown on the player display and the audio screen.

When your FTS program is complete, press ▶ **PLAY** to start play, the FTS program will be automatically memorized.

- Press **FTS** or use the ◁ ▷ (left/right cursor) to set FTS to ON or OFF.

Erasing a track from an FTS-program

1 Use ▽ (down cursor) to go to the list of selected tracks.
2 Use ◁ and ▷ (left/right cursor) to select the track number you wish to erase. To go directly to any track, enter the track number using the numerical keys **0-9**.
3 Press **OK**.
➤ The track number will be erased from the list of selected tracks.

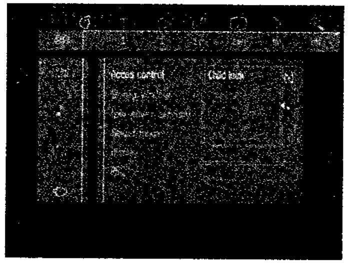
Erasing the complete program

- Use ▽ (down cursor) to select Clear All and press **OK**.
  ➤ The complete FTS program for the disc will be erased.

Access control; disc lock (DVD and VCD)

Activating/deactivating the disc lock

1 In Stop mode, select **Access Control** in the Features menu ⇦ using the ▽/△ (down/up) keys and press ▷ (right cursor).
2 Enter a 4-digit PIN code of your own choice.
3 Enter the code a second time.
4 Move to **Child lock** using the ▽/△ (down/up) keys.



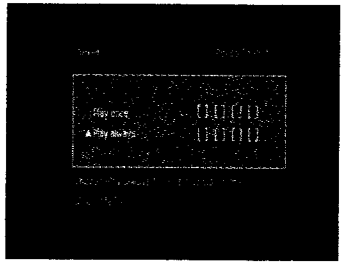
5 Move to 🔓 / 🔒 using the ▷ (right cursor) key.
6 Select 🔒 using the ▽/△ (down/up) keys.
7 Press **OK** to confirm or ◁ (left cursor) to confirm and press ◁ (left cursor) again to exit the menu.
➤ Now unauthorized discs will not be played unless the 4-digit code is entered.
8 Select 🔓 to deactivate the disc lock.

Note: Reconfirmation of the 4-digit PIN code is necessary when:
- The code is entered for the very first time (see above);
- The code is changed (see 'Changing the 4-digit code');
- The code is cancelled (see 'Changing the 4-digit code');
- Both Disc lock and Parental Control are switched OFF and the code is requested.

Authorizing discs

- Insert the disc. See 'Loading a disc'.
➤ The Disc lock dialog will appear. You will be asked to enter your secret code for 'Play Once' or 'Play Always'. If you select 'Play Once', the disc can be played as long as it is in the player and the player is in the ON position. If you select 'Play Always', the disc will become child safe (authorized) and can always be played even if the Disc lock is set to ON.

Notes: The player memory maintains a list of up to 80 authorized ('Child safe') disc titles. A disc will be placed in the list when 'Play Always' is selected in the 'child protect' dialog. Each time a 'child safe' disc is played it will be placed on top of the list When the list is full and a new disc is added, the last disc in the list will be removed from the list.
Double sided DVD discs may have a different ID for each side. In order to make the disc 'child safe', each side has to be authorized.
Multi volume VCD disc may have a different ID for each volume. In order to make the complete set 'child safe', each volume has to be authorized.



Deauthorizing discs

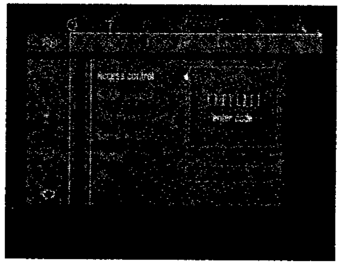
- Insert the disc. See 'Loading a disc'.
➤ Playback starts automatically.
- Press ■ **STOP** while ☺ is visible.
➤ The ☹ will appear and the disc is now deauthorized.

Access control; Parental control (DVD-Video only)

Movies on DVD discs may contain scenes not suitable for children. Therefore discs may contain 'Parental Control' information which applies to the complete disc or to certain scenes on the disc. These scenes are rated from 1 to 8 and alternative, more suitable scenes are available on the disc. Ratings are country dependent. The 'Parental Control' feature allows you to prevent discs from being played by your children or to have certain discs played with alternative scenes.

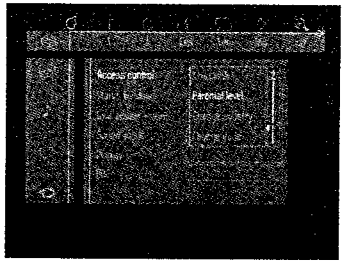
Activating/Deactivating Parental Control

1 In Stop mode, select **Access Control** in the Features menu ⇦ using the ▽/△ (down/up) keys and press ▷ (right cursor).



2 Enter your 4-digit PIN code. If necessary enter the code a second time.
3 Move to **Parental Level** using the ▽/△ (down/up) keys.
4 Move to the Value Adjustment bar using the ▷ (right cursor) key.
5 Then use the ▽/△ (down/up) keys or the numerical keys **0-9** on the remote control to select a rating from 1 to 8 for the disc inserted.

Rating 0 (displayed as '– –'):
Parental Control is not activated. The Disc will be played in full.
Ratings 1 (child safe) to 8 (adults only):
The disc contains scenes not suitable for children. If you set a rating for the player, all scenes with the same rating or lower will be played. Higher rated scenes will not be played unless an alternative is available on the disc. The alternative must have the same rating or a lower one. If no suitable alternative is found, play will stop and the 4-digit code has to be entered.



6 Press **OK** or ◁ (left cursor) to confirm and press ◁ (left cursor) again to exit the menu.

Country

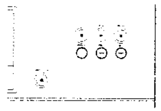
1 In Stop mode, select **Access Control** in the Features menu ⇦ using the ▽/△ (down/up) keys and press ▷ (right cursor).
2 Enter your 4-digit Pincode.
3 Move to **Change Country** using the ▽ (down) key.
4 Press the ▷ (right) key.
5 Select a country using ▽/△ (down/up cursor).
6 Press **OK** or ◁ (left cursor) to confirm and press ◁ (left cursor) again to exit the menu.

Changing the 4-digit code

1 In Stop mode, select **Access Control** in the Features menu ⇦ using the ▽/△ (down/up) keys and press ▷ (right cursor).
2 Enter the old code.
3 Move to **Change Code** using the ▽ (down) key.
4 Press the ▷ (right) key.
5 Enter the new 4-digit PIN code.
6 Enter the code a second time and reconfirm with **OK**.
7 Press ◁ (left cursor) to exit the menu.

Note: If you forgot your code, press ■ **STOP** *four times while in the access control PIN code box and exit with* **OK**. *Access control is now switched off. You can then enter a new code (twice!) as described above.*

Loading DVD or VCD discs



1 Press ▲ **OPEN/CLOSE** on the front of the player. The disc loading tray opens.
2 Lay the disc in the tray, label side up (also when a double sided DVD disc is inserted). Make sure it is sitting properly in the correct recess.
3 Gently push the tray, or press ▲ **OPEN/CLOSE**, to close the tray.
➤ READING appears in the status window and on the player display and playback starts automatically.

Note: If a DVD disc is inserted and 'Disc Lock' is set to ON while the disc inserted is not in the 'child safe' list (not authorized), the PIN code must be entered and/or the disc has to be authorized. (see 'Access Control')

Playing a DVD-video disc

Playing a title

➤ After inserting the disc and closing the tray, playback starts automatically and the status window and the player display show the type of disc loaded as well as information about the disc's contents and playing time. The disc may invite you to select an item from a menu. If the selections are numbered, press the appropriate numerical key **0-9**; if not, use the ▽/△, ◁/▷ (down/up/left/right) keys to highlight your selection, and press **OK**.
➤ The currently playing title and chapter number are displayed in the menu bar and the player display. The elapsed playing time is shown in the status window and the player display.
➤ At the beginning of each title the number of front channels and surround channels will be displayed (e.g. 3/2). If a subwoofer channel is present this will also be displayed (+1).
➤ If during play the audio format (MPEG 2, Dolby Digital, etc.) of a title changes this will be indicated on the display.

- If required, you can use the **SOUND MODE** key to select Stereo, Dolby Surround, 3D-Sound or Multi-channel reproduction. Play may stop at the end of the Title, this can result in return to menu.
- To stop play at any time, press ■ **STOP**.
➤ The default screen will then appear, giving information about the current status of the player.
- You can resume play from the point at which you stopped by pressing ▶· **RESUME**.
➤ The resume feature applies, not only to the disc in the player, but also to the last four discs you have played. Simply reload the disc, press ▶ **PLAY** and when you see the Resume icon ▶· on the screen, press ▶ **PLAY** again.

Note: Since it is usual for DVD movies to be released at different times in different regions of the world, all players have region codes and discs can have an optional region code. If you load a disc of a different region code to your player, you will see the region code notice on the screen. The disc will not play, and should be unloaded.

Playing a video CD

Playing a disc

- After inserting the disc and closing the tray, playback starts automatically and the status window and the player display show the type of disc loaded as well as information about the disc's contents and playing time
- The disc may invite you to select an item from a menu. If the selections are numbered, press the appropriate numerical key **0-9**.
- The currently playing track number is displayed in the menu bar and the player display. The elapsed playing time is shown in the status window and the player display.

- If required, you can use the **SOUND MODE** key to select Stereo, Dolby Surround or 3D-Sound reproduction.
- To stop play at any time, press ■ **STOP**.
➤ The default screen will then appear.
- You can resume play from the point at which you stopped by pressing ▶· **RESUME**. The resume feature applies, not only to the disc in the player, but also to the last four discs you have played. Simply reload the disc, press ▶ **PLAY** and when you see the Resume icon on the screen ▶· , press ▶ **PLAY** again.

General features

Note: Unless stated otherwise, all operations described are based on remote control operation. A number of operations can also be carried out via the menu bar on the screen. (see 'Menu bar operation')

Moving to another title/track

When a disc has more than one title or track (which you can see from both the menu bar and the player display), you can move to another title as follows:

- Press **T** (title), then press ▶▶| **NEXT** briefly during play to select the next title/track.
- Press **T** (title), then press |◀◀ **PREVIOUS** briefly during play to return to the beginning of the current title/track. Press |◀◀ **PREVIOUS** twice briefly to step back to the previous title/track.
- To go directly to any title or track, select **T** (title), then enter the title number using the numerical keys **0-9**.

Note: If the number has more than one digit, press the keys in rapid succession.

Moving to another chapter/index

When a title on a disc has more than one chapter or a track has more than one index (which you can see from the player display and on the menu bar), you can move to another chapter/index as follows:

- Press ▶▶| **NEXT** briefly during play to select the next chapter/index.
- Press |◀◀ **PREVIOUS** briefly during play to return to the beginning of the current chapter/index. Press |◀◀ **PREVIOUS** twice briefly to step back to the previous chapter/index.
- To go directly to any chapter or index, select **C** (chapter), then enter the chapter or index number using the numerical keys **0-9**.

Note: If the number has more than one digit, press the keys in rapid succession.

Slow Motion

- Select ◁▸ (Slow motion) in the menu bar.
- Use the ▽ (down) key to enter the Slow Motion menu.
➤ The player will now go into Pause mode.
- Use the ◁ ▷ (left/right) keys to select the required speed: -1, -1/2, -1/4 or -1/8 (backward); +1/8, +1/4, +1/2 or +1 (forward).
- Select 1 to play at normal speed again.
- If **II PAUSE** is pressed, the speed will be set to 0.
- To exit slow motion mode, press ▶ **PLAY** and then △ (up cursor).

You can also select Slow motion speeds by using the |▶ button on the remote control.

Still Picture and Step Frame

- Select ◀|▶ (picture by picture) in the menu bar.
- Use the ▽ (down) key to enter the picture by picture menu.
➤ The player will now go into Pause mode.
- Use ◁ ▷ (left/right) keys to select previous or next picture.
- To exit Picture by picture mode, press ▶ **PLAY**.

You can also step forward by using the **II PAUSE** repeatedly on the remote control.

Search

- Select ◁▷ (Fast motion) in the menu bar.
- Use the ▽ (down) key to enter the Fast motion menu.
- Use the ◁ ▷ (left/right) keys to select the required speed: -32, -8 or -4 (reverse); +4, +8, +32 (forward).
- Select 1 to play at normal speed again.
- To exit Fast motion mode, press ▶ **PLAY** and then △ (up cursor).

To search forward or backward through diffirent speeds, you can also use ◀◀ or ▶▶.

Repeat

DVD-Video Discs - Repeat chapter/title/disc

- To repeat the currently playing chapter, press **REPEAT**.
➤ REPEAT CHAPTER appears on the player display.
- To repeat the currently playing title, press **REPEAT** a second time.
➤ REPEAT TITLE appears on the display.
- To repeat the entire disc, press **REPEAT** a third time.
➤ REPEAT ALL appears on the display.
- To exit Repeat mode, press **REPEAT** a fourth time.

Video CDs - Repeat track/disc

- To repeat the currently playing track, press **REPEAT**.
➤ REPEAT TRACK appears on the player display.
- To repeat the entire disc, press **REPEAT** a second time.
➤ REPEAT ALL appears on display and screen.
- To exit Repeat mode, press **REPEAT** a third time.

Repeat A-B

To repeat or loop a sequence in a title:

- Press **REPEAT A-B** at your chosen starting point.
  ➤ A appears on the screen.
- Press **REPEAT A-B** again at your chosen end point.
  ➤ A-B REPEAT appears on the display, and the repeat sequence begins.
- To exit the sequence, press **REPEAT A-B**.

Scan

Plays the first 10 seconds of each chapter on the disc.

- Press **SCAN**.
- To continue play at your chosen chapter press **SCAN** again or press ▶ **PLAY**.

Shuffle

DVD-Video discs

This shuffles the playing order of chapters within a title, if the title has more than one.

- Press **SHUFFLE** during play.
  ➤ The shuffle icon appears on the screen for about 2 seconds.
- To return to normal play, press **SHUFFLE** again.

Video CDs

This shuffles the playing order of the tracks, if the disc has more than one.

- Press **SHUFFLE** during play.
  ➤ The Shuffle icon appears on the screen for about 2 seconds.
- To return to normal play, press **SHUFFLE** again.

Time search

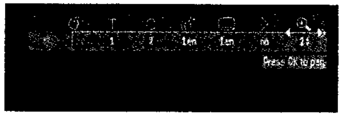
The Time Search function allows you to start playing at any chosen time stamp.

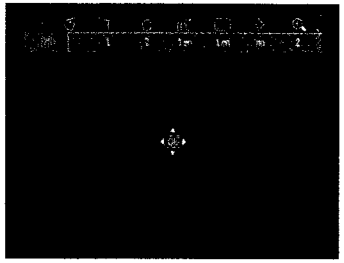
- Select 🕒 (Time Search) in the menu bar.
- Press ▽ (down cursor).
  ➤ The player will now go into Pause mode.
  ➤ A time edit box appears on the screen showing the elapsed playing time of the current disc.
- Use the digit keys **0-9** to enter the required start time. Enter hours, minutes and seconds from left to right in the box.
  ➤ Each time an item has been entered, the next item will be highlighted.
- Press **OK** to confirm the start time.
  ➤ The time edit box will disappear and play starts from the selected time position.

Zoom

The Zoom function allows you to enlarge the video image and to pan through the enlarged image.

- Select 🔍 (Zoom) in the menu bar.
- Press ▽ △ (down/up cursor) to activate the Zoom function and select the required zoom factor: 1.33 or 2 or 4.
  ➤ The player will go into Pause mode.
  ➤ The selected zoom factor appears below the Zoom icon 🔍 in the menu bar and 'Press OK to pan' appears below the menu bar.
  ➤ The picture will change accordingly.
- Press **OK** to confirm the selection.
  ➤ The panning icons appear on the screen: △ ▽ ◁ ▷ and **OK**.
- Use the △ ▽ ◁ ▷ (up/down/left/right) keys to pan all over the screen.
- When **OK** is pressed only the zoomed picture will be shown on the screen.
- If you wish to zoom at any moment, press 🔍 (Zoom) and select the required zoom factor as described above.
- To exit Zoom mode, press ▶ **PLAY**.
  ➤ Playback will resume.





FTS-Video

- The FTS-Video function allows you to store your favourite titles and chapters (DVD) and favourite tracks (VCD) for a particular disc in the player memory.
- Each FTS program can contain 20 items (titles, chapters).
- Each time an FTS program is played it will be placed on top of the list. When the list is full and a new program is added, the last program in the list will be removed from the list.
- The selections can be called up and played at any time.

Storing a FTS-Video Program

- In Stop mode, select Video FTS ☑ in the menu bar.
- Press ▽ (down cursor) to open the menu.
  ➤ The Video FTS menu appears.

Storing titles/tracks

- Press ▽ (down cursor) to select title.
- Use ◁ ▷ (left/right cursors) to select the required title.
- Press **OK** if you wish to store the entire title.
  ➤ The title number will be added to the list of selections.

Storing chapters

- Press ▽ (down cursor) on the selected title number.
  ➤ The title number will be marked and the highlight moves to the first available chapter number for this title.
- Use ◁ ▷ (left/right cursors) to select the required chapter number.
- Press **OK** to confirm the selection.
  ➤ The title/chapter selection will be added to the list of selections.
- Press **OK** or **MENU SYSTEM** to exit the Video FTS menu.

Erasing a title/track FTS-Video Program

- In Stop mode, select Video FTS ☑ in the menu bar.
- Use ▽ (down cursor) to select program.
- Use ◁ ▷ (left/right cursors) to select the required selection number.
- Press **OK** to erase the selection.
- Press △ (up cursor) or **MENU SYSTEM** to exit the Video FTS menu.

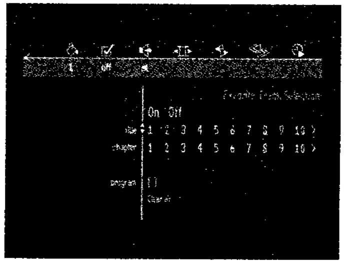
If you wish to erase all selections:

- In Stop mode, select FTS Video ☑ in the menu bar.
- Use ▽ (down cursor) to select Clear all.
- Press **OK**.
  ➤ All selections will now be erased.
- Press △ (up cursor) or **MENU SYSTEM** to exit the Video FTS menu.

Switch FTS Video On or Off:

- Select FTS Video ☑ in the menu bar and press ▽ (down cursor).
  ➤ The video FTS menu appears.
- Press ◁ ▷ (left/right cursors) to select On or Off.
- Press △ (up cursor) or **MENU SYSTEM** to exit the Video FTS menu.

You can also switch FTS Video ON or OFF by using the **FTS** button on the remote control.



Special DVD-features

Checking the contents of DVD-Video discs: Menus

For titles and chapters, selection menus may be included on the disc. The DVD's menu feature allows you to make selections from these menus. Press the appropriate numerical key; or use the ▽, △, ▷, ◁ (down/up/right/left) keys to highlight your selection, and press **OK**.

Title menus

- Press **DISC MENU**.
  ➤ If the current title has a menu, this now appears on the screen. If no menu is present in the title, the disc menu will be displayed.
- The menu can list camera angles, spoken language and subtitle options, and chapters for the title.
- To remove the title menu, press **DISC MENU** again.

Menu Disc

- Press **T** followed by **DISC MENU**.
  ➤ The disc menu is displayed.
- To remove the disc menu, press **DISC MENU** again.

Camera Angle

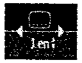
If the disc contains sequences recorded from different camera angles, the angle icon ▷ appears, showing the number of available angles, and the angle being shown. You can then change the camera angle if you wish.

- Use the ▽ △ (down/up) keys to select the required angle in the angle icon.
- To go to any angle directly, enter the angle number using the numerical keys **0-9**.
  ➤ After a small delay, play changes to the selected angle. The angle icon remains displayed until multiple angles are no longer available.

Changing the audio language

- Select (Audio) in the menu bar.
- Press or ▽ △ (down/up cursors) repeatedly to step through the different languages.
- You can enter the required language number directly using the numerical keys **0-9**.

Subtitles



- Select ☐ (Subtitle) in the menu bar.
- Press ☐ or ▽ △ (down/up cursors) repeatedly to step through the different subtitles.
- You can enter the required subtitle number directly using the numerical keys **0-9**.

Special VCD-Features

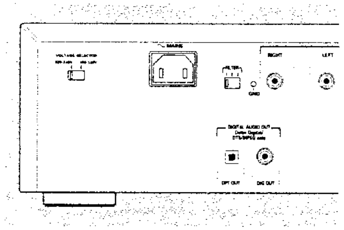
Playback Control (PBC)

- Load a Super Video CD with PBC and press ▶ **PLAY**.
  ➤ The PBC menu appears on the TV screen.
- Go through the menu with the keys indicated on the TV screen until your chosen passage starts to play. If a PBC menu consists of a list of tracks, you can select a track directly.
- Enter your choice with the numerical keys **0-9**.
- Press **RETURN** to go back to the previous menu.

Enhanced use

Filter switch

Not all amplifiers/receivers and speakers can handle the extended frequency response of SACD. Your SACD is equipped with a switchable filter on the rear. The factory setting of this filter is 40 KHz which is safe for all systems. If your system can handle the full frequency range of SACD (check the relevant manuals or, when in doubt, contact your dealer) do the following:



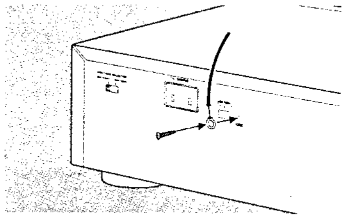
Set the switch to the required output signal.
Position 1 : 40 kHz - output signal on all speakers is set to 40 kHz.
Position 2 : 50 kHz FRONT/40 kHz OTHERS - output signal on front speakers is set to 50 kHz; output signal on all other speakers is set to 40 kHz.
Position 3 : 50 kHz - output signal on all speakers is set to 50 kHz.

Warning: When you are not sure your system is able to handle audio input signals up to 50 KHz do not change the output signal. You may damage your speakers or amplifier/receiver.

System grounding

When your system consists of a lot of components, occasional disturbance problems (like howling noises) may occur. These problems can be solved by grounding the system.

1 Unscrew ground connector GND halfway, connect an earth wire to the connector and tighten the connector again.



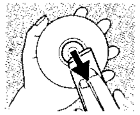
2 Connect the earth wire to the ground connector of the next component in the system.
3 If ground connectors are available on the other components of your system, ground the other components in the same way.

Before requesting service

If it appears that the SACD player is faulty, first consult this checklist. It may be that something has been overlooked. Under no circumstances attempt to repair the system yourself; this will invalidate the warranty.

Look for the specific symptom(s). Then perform only the actions listed to remedy the specific symptom(s).

Symptom	Remedy
No power	Check if both plugs of the mains cord are properly connected. Check if there is power at the AC outlet by plugging in another appliance.
No sound	Check audio connections. If using a HiFi amplifier, try another sound source.
Distorted sound from HiFi amplifier	Check to make sure that no audio connections are made to amplifier phono input.
Disc can't be played	Ensure the disc label is upwards. Clean the disc. Check if the disc is defective by trying another disc.
No picture	Check if the TV is switched on. Check the video connection.
Distorted picture	Check the disc for fingerprints and clean with a soft cloth, wiping from centre to edge. Sometimes a small amount of picture distortion may appear. This is not a malfunction.
Completely distorted picture with player menu	The NTSC/PAL switch may be in the wrong status. Press the ■ **STOP** and ▸▸ **FORWARD** buttons simultaneously and keep them pressed while you turn the player ON.
No colour in picture with player menu	The NTSC/PAL switch may be in the wrong status. Press the ■ **STOP** and ▸▸ **FORWARD** buttons simultaneously and keep them pressed while you turn the player ON.
No return to start-up screen when disc is removed	Reset by switching the player OFF, then ON again. Check to see if the program requires another disc to be loaded.
The player does not respond to the remote control	Aim the remote control directly at the sensor on the front of the player. Avoid all obstacles that may interfere with the signal path. Inspect or replace the batteries. Check device code setting. See chapter 'Remote control device code'.
Distorted or black and white picture with DVD or Video CD disc	Use only discs that match the TV system of the TV-set used (PAL/NTSC).
No audio at digital output	Check the digital connections. Check the settings menu to make sure that the digital output is set to on. Check if the audio format of the selected audio language matches your receiver capabilities.
Buttons do not work	Reset by switching the player OFF then ON again.
Audible 'clicks' from player's internal	During operation the relais of the player may be switched, leading to an audible 'click'. This is not a malfunction.
Player does not respond to all operating Commands during playback	Operations are not permitted by the disc. Refer to the instructions in the disc inlay.
Disturbance problems (like howling noises) during playback	Ground the system. See 'System grounding'.



Cleaning discs

Some problems occur because the disc inside the player is dirty. To avoid these problems clean your discs regularly, in the following way:

- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out.

Caution: Do not use solvents such as benzine, thinner, commercially available cleaners, or anti-static spray intended for analog discs.

Diagnostic program

If the player is still faulty you can start the Diagnostic Program in the player.

You can operate the Diagnosis Program by following the step-by-step instructions below.

Instructions

1. Switch the player OFF with the **ON/OFF** button.
2. Press the **OPEN/CLOSE** and **II** button simultaneously and keep them pressed while you turn the player ON.
   ➤ On the display the message BUSY appears together with a counter that counts down as the test is running, reaching zero by the end of the test.
   ➤ After a few minutes, the message on the local display changes from BUSY to ERROR or to PASS.
   ➤ If the message ERROR appears on the display, there is apparently a failure in your player and your player should be repaired.
3. Consult your dealer or the Philips Customer Care Centre for the nearest Service Repair Shop in your country. The phone number is given in your warranty booklet.
4. If the message PASS appears on the display, there is apparently no failure in your player. In this case the failure can be caused by incorrect interpretation of the operating instructions, the use of a wrong disc or the fact that your player is incorrectly connected. In this case, you should consult your dealer or the Philips Customer Care Centre for further assistance in solving the problem.
5. If the problem remains, return to point 3 of this instruction to find the nearest repair shop.
6. Switch the player OFF with the **ON/OFF** button to leave the diagnostic program.

4. Mechanical- and dismantling instructions

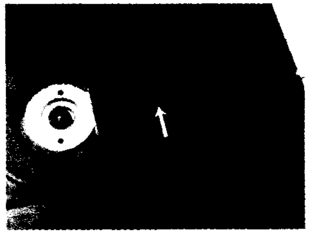
DISMANTLING INSTRUCTIONS

See exploded view for item numbers

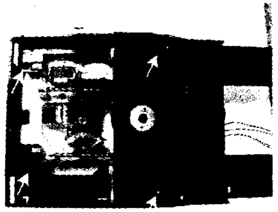
mounting
↑
↓
demounting

- **Cover 151**
  - ⇒ Remove 9 screws 171→174 at both sides 175→179 at the rearside
  - ⇒ Lift the cover at the rearside to remove
  - **Front assy(1+2+4+6+7+1001)**
    - ⇒ open the tray and remove the tray front 45
    - ⇒ remove 4 screws 75→ 78 (front assy →frame 181)
    - ⇒ unlock the front from the frame by releasing successively 6 snaps (1 on the left, 2 in the middle, 1 on the right and 2 on the bottom plate)
    - ⇒ Turn the front assy backwards and put it on top of the set (Service position)
    - **Display board 1001**
      - ⇒ Remove 5 screws 30→34 (board → front)
      - ⇒ demount the board
    - **ON/OFF BOARD 1001**
      - ⇒ remove screw 30 (board → front)
      - ⇒ demount the board
  - **DAC PCB 1005**
    - ⇒ remove the connections to the DAC PCB
    - ⇒ remove 4 screws 206→209 on top of the PCB
    - ⇒ remove 7 screws 269→276 (cinches → backplate)
    - ⇒ demount the board
    - **A/V board 1003**
      - ⇒ remove the flex connections to the mono board
      - ⇒ remove screws (cinches → backplate)
      - ⇒ demount the board
    - **Dust Bracket 241**
      - ⇒ remove 4 screws 243→246
      - ⇒ demount the bracket
      - **SACD MODULE (81 + 1002)**
        - ⇒ Remove the connections to the monoboard
        - ⇒ Remove 4 screws (255→258) (dust cover 247→ loader 81)
        - ⇒ Remove dust cover 247
        - ⇒ Open the tray. If electrically not possible, see the instruction below.
        - ⇒ Remove 4 screws 200→ 203 (loader 81→frame 181)
        - ⇒ Demount the module
        - **SACD Mono board 1001**
          - ⇒ Remove the flex connections to the turntabel motor and the sledge motor.
          - ⇒ Remove 4 screws 82→85 (mono board 1002→ loader 81)
          - ⇒ Remove carefully the flex connection to the OPU and the wire connection to tray motor.
          - ⇒ Demount the board
        - **Loader VAL6011/01 81**
          - ⇒ Is a non repairable unit
  - **Linear power supply 1005**
    - ⇒ Remove the connections
    - ⇒ Remove 2 screws 214 and 215 (board → frame)
    - ⇒ Remove 2 screws 290 and 291 (mains inled → backplate)
    - ⇒ Remove 2 screws 277 and 278 (voltage selector → backplate)
    - ⇒ Release the snaps of 2 spacers 225 and 226 (board → frame)
    - ⇒ Demount the board
    - **Switched mode power supply 1004**
      - ⇒ Remove the connections
      - ⇒ Remove 5 screws (board → bottom plate)
      - ⇒ Demount the board
    - **Transformer 1007**
      - ⇒ Remove 4 screws 237→240 (trafo→ bottom plate)
      - ⇒ Demount the transformer

Manually opening of tray
When it is not possible to open the tray with the open/close button, the tray can manually be opened.
When no disc is loaded, unlock the tray by moving the slide from the left to the right and pull tray outwards.



Remove 4 screws to remove loader.



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Before requesting service

If it appears that the SACD player is faulty, first consult this checklist. It may be that something has been overlooked. Under no circumstances attempt to repair the system yourself; this will invalidate the warranty.

Look for the specific symptom(s). Then perform only the actions listed to remedy the specific symptom(s).

Symptom	Remedy
No power	Check if both plugs of the mains cord are properly connected. Check if there is power at the AC outlet by plugging in another appliance.
No sound	Check audio connections. If using a HiFi amplifier, try another sound source.
Distorted sound from HiFi amplifier	Check to make sure that no audio connections are made to amplifier phono input.
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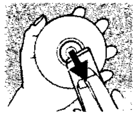
No picture	Check if the TV is switched on. Check the video connection.
Distorted picture	Check the disc for fingerprints and clean with a soft cloth, wiping from centre to edge. Sometimes a small amount of picture distortion may appear. This is not a malfunction.
Completely distorted picture with player menu	The NTSC/PAL switch may be in the wrong status. Press the ■ **STOP** and ►► **FORWARD** buttons simultaneously and keep them pressed while you turn the player ON.
No colour in picture with player menu	The NTSC/PAL switch may be in the wrong status. Press the ■ **STOP** and ►► **FORWARD** buttons simultaneously and keep them pressed while you turn the player ON.
No return to start-up screen when disc is removed	Reset by switching the player OFF, then ON again. Check to see if the program requires another disc to be loaded.
The player does not respond to the remote control	Aim the remote control directly at the sensor on the front of the player. Avoid all obstacles that may interfere with the signal path. Inspect or replace the batteries. Check device code setting. See chapter 'Remote control device code'.
Distorted or black and white picture with DVD or Video CD disc	Use only discs that match the TV system of the TV-set used (PAL/NTSC).
No audio at digital output	Check the digital connections. Check the settings menu to make sure that the digital output is set to on. Check if the audio format of the selected audio language matches your receiver capabilities.
Buttons do not work	Reset by switching the player OFF then ON again.
Audible 'clicks' from player's internal	During operation the relais of the player may be switched, leading to an audible 'click'. This is not a malfunction.
Player does not respond to all operating Commands during playback	Operations are not permitted by the disc. Refer to the instructions in the disc inlay.
Disturbance problems (like howling noises) during playback	Ground the system. See 'System grounding'.

Cleaning discs



Some problems occur because the disc inside the player is dirty. To avoid these problems clean your discs regularly, in the following way:

- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out.

Caution: Do not use solvents such as benzine, thinner, commercially available cleaners, or anti-static spray intended for analog discs.

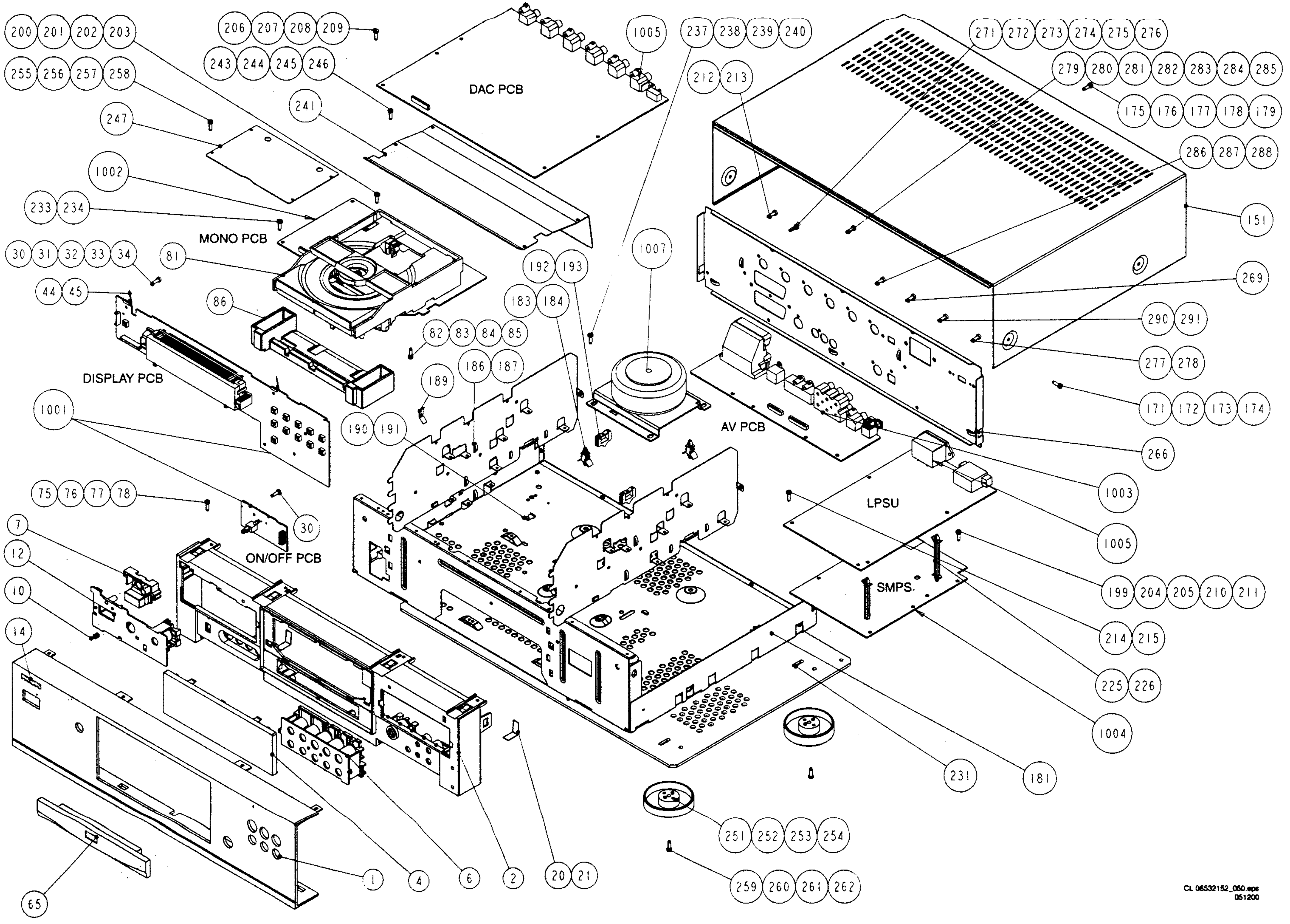
Diagnostic program

If the player is still faulty you can start the Diagnostic Program in the player.

You can operate the Diagnosis Program by following the step-by-step instructions below.

Instructions

1 Switch the player OFF with the **ON/OFF** button.
2 Press the **OPEN/CLOSE** and **II** button simultaneously and keep them pressed while you turn the player ON.
   ➤ On the display the message BUSY appears together with a counter that counts down as the test is running, reaching zero by the end of the test.
   ➤ After a few minutes, the message on the local display changes from BUSY to ERROR or to PASS.
   ➤ If the message ERROR appears on the display, there is apparently a failure in your player and your player should be repaired.
3 Consult your dealer or the Philips Customer Care Centre for the nearest Service Repair Shop in your country. The phone number is given in your warranty booklet.
4 If the message PASS appears on the display, there is apparently no failure in your player. In this case the failure can be caused by incorrect interpretation of the operating instructions, the use of a wrong disc or the fact that your player is incorrectly connected. In this case, you should consult your dealer or the Philips Customer Care Centre for further assistance in solving the problem.
5 If the problem remains, return to point 3 of this instruction to find the nearest repair shop.
6 Switch the player OFF with the **ON/OFF** button to leave the diagnostic program.


200 201 202 203
206 207 208 209
1005
237 238 239 240
271 272 273 274 275 276
255 256 257 258
243 244 245 246
212 213
279 280 281 282 283 284 285
DAC PCB
175 176 177 178 179
247
241
1002
286 287 288
233 234
151
MONO PCB
1007
30 31 32 33 34
81
192 193
269
44 45
183 184
86
82 83 84 85
290 291
277 278
DISPLAY PCB
189
186 187
1001
AV PCB
171 172 173 174
190 191
266
1003
75 76 77 78
LPSU
30
7
ON/OFF PCB
1005
12
SMPS.
199 204 205 210 211
10
14
214 215
225 226
1004
231
181
251 252 253 254
65
1
4
6
2
20 21
259 260 261 262

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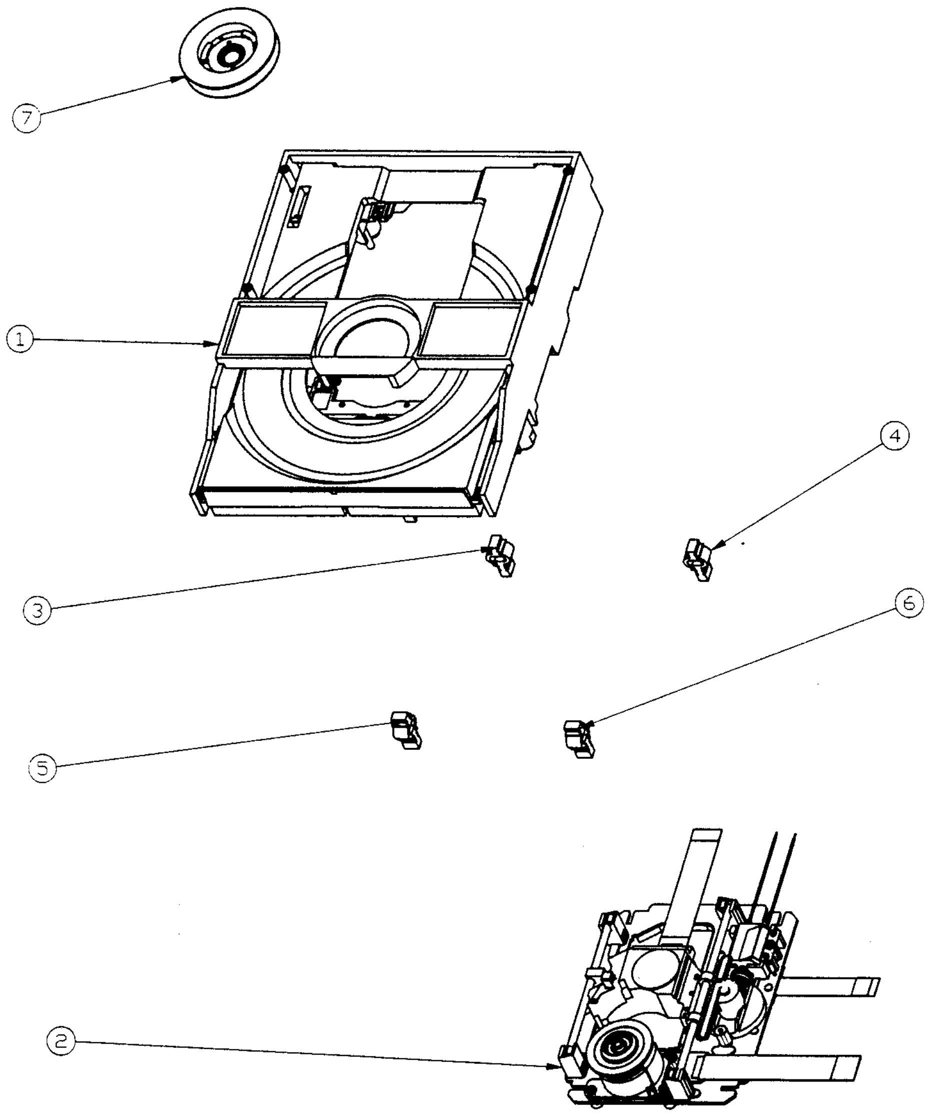

	9305 023 61101	VAL6011/01 LOADER COMPLETE (for /001/691)
	9305 023 61102	VAL6011/02 LOADER COMPLETE (for /171)
1	3139 197 60090	GENEVA LP LOADER ASSY
2	9305 022 60101	VAM6001/01
3+4	3139 194 00710	SUSPENSION (YELLOW)
5+6	3139 194 00620	SUSPENSION (BLUE)
7	3139 197 60060	CLAMPER ASSY

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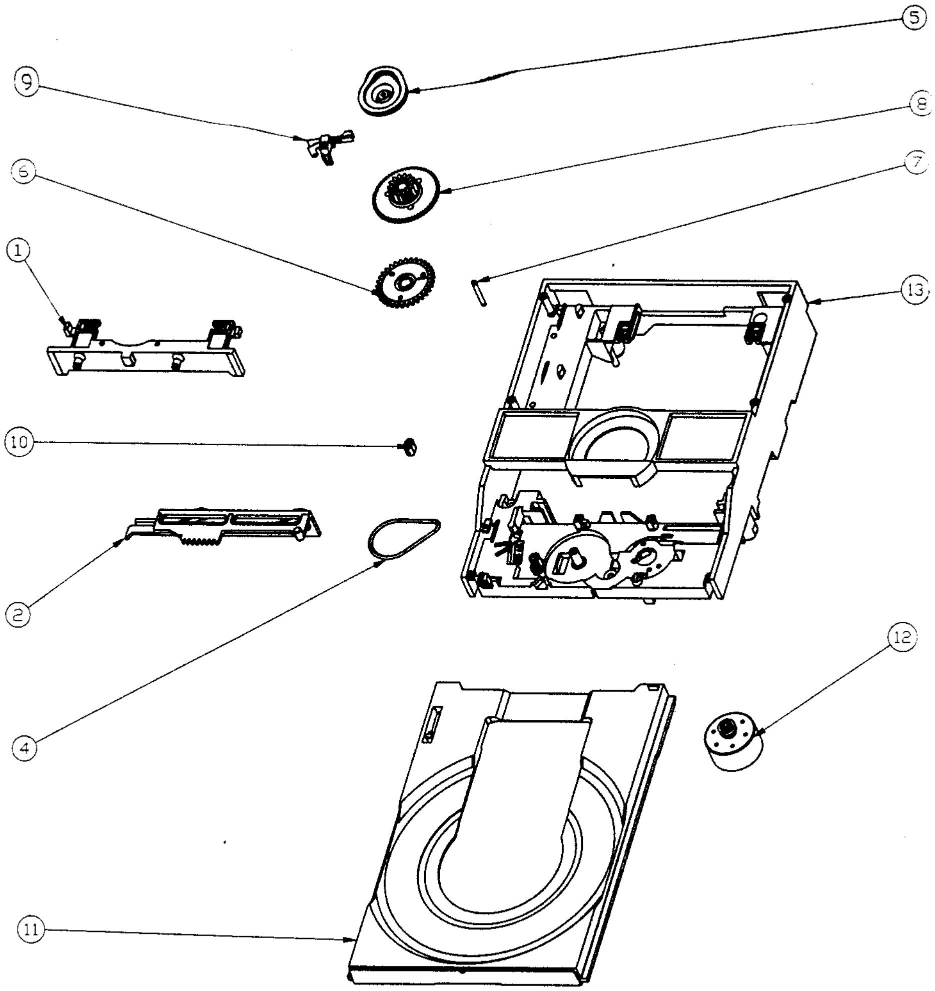

4	4822 358 10266	BELT
9	3139 198 80010	SWITCH
10	4822 532 13097	TULE
11	3139194 00270	TRAY
12	3139 197 50060	TRAY MOTOR ASSY

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5. Diagnostic software, trouble shooting and test instructions

Due to the complexity of the SACD player, the time to find a defect in the player can become long. To reduce this time, the player has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the SACD1000 player hardware and tests the following:

- Interconnections between components
- Accessibility of components
- Functionality of the audio and video paths

This functionality can be accessed via several interfaces:

1. End user/Dealer script interface
2. Player script interface
3. Menu and command interface

5.1 END USER/DEALER SCRIPT INTERFACE

5.1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone SACD player; no other equipment is needed. During this mode, a number of hardware tests (nuclei) are automatically executed to check if the player is faulty. The diagnosis is simply a "fail" or "pass" message. If the message "FAIL" appears on the display, there is apparently a failure in the player. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the player because the nuclei in this mode don't cover the complete functionality of the player.

5.1.2 Contents

The End use/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone SACD player. The nuclei called in the End user/ Dealer script are the following:

Display Count-down	Nucleus number	Nucleus name
7	104	Host Decoder SDRAM Write Read
6	123	Host Decoder I2C NVRAM
5	500	Front Panel Echo
4	601	Basic Engine Echo
3	1200	Furore SDRAM Low Write Read
2	1201	Furore SDRAM High Write Read
1	1300	DAC Board I2C Test

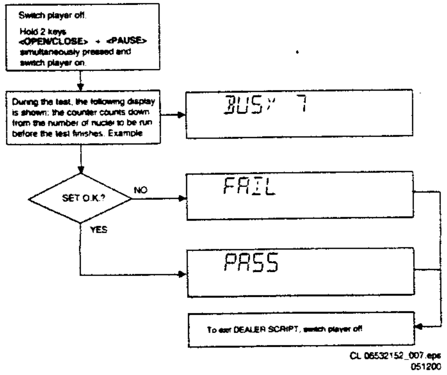
Switch player off.
Hold 2 keys
<OPEN/CLOSE> + <PAUSE>
simultaneously pressed and switch player on.
During the test, the following display is shown: the counter counts down from the number of nuclei to be run before the test finishes. Example
BUSY 7
SET O.K.?
NO
YES
FAIL
PASS
To exit DEALER SCRIPT, switch player off
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Figure 5-1

5.2 PLAYER SCRIPT INTERFACE

5.2.1 Description

The Player script will give the opportunity to perform a test that will determine which of the SACD player's modules are faulty, to read the error log and to perform an endurance loop test. To successfully perform the tests, the SACD player must be connected to a TV set, a multi-channel amplifier, a set of 6 boxes and an external video source to check the output of a number of nuclei.
To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the Basic Engine module) require that the SACD player itself is opened, to enable the user to observe moving parts and approve their movement visually.
Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

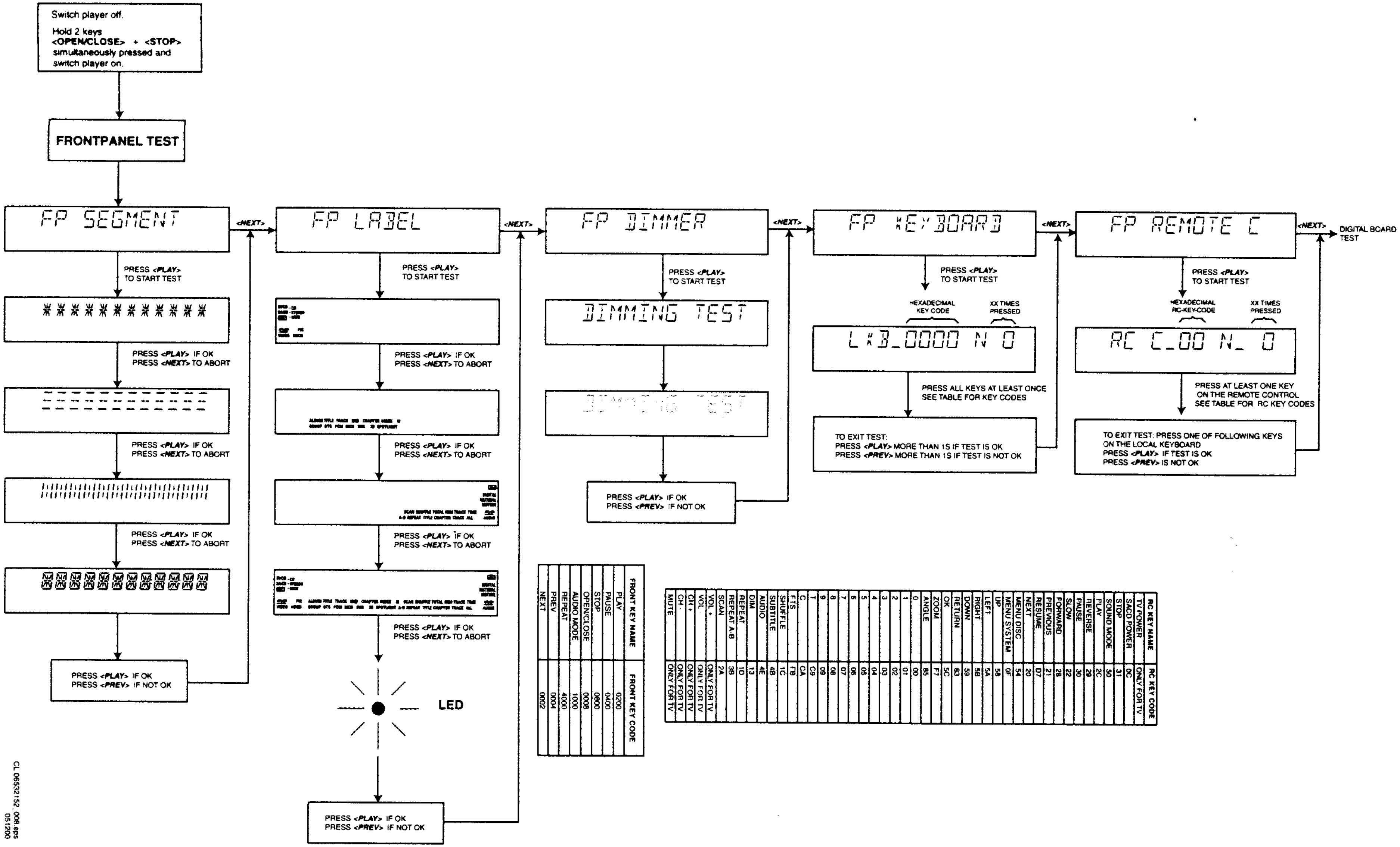
5.2.2 Structure of the Player Script

The player script consists of a set of nuclei testing the hardware modules in the SACD player: the Display PWB, the Digital PWB, the Basic Engine, the DAC PWB and the AV PWB.
Nuclei run by the player test need some user interaction; in the next table this interaction is described. The player test is done in two phases:

- Interactive tests: this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test. Reading the error log information can be useful to determine any errors that occurred recently during normal operation of the DVD player.
- The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely.

Step	Description	Executing nucleus
1	Press OPEN/CLOSE and STOP, and turn on the player.	?
2	Display shows "FP SEGMENT". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 7.	502
3	Starbursts are visible. Press PLAY.	502
4	Horizontal bars are visible. Press PLAY.	502
5	Vertical bars are visible. Press PLAY.	502
6	All segments are visible. Press PLAY.	502
7	Display shows "FP LABEL". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 13.	503
8	Labels of the first grid are visible. Press PLAY.	503
9	Labels of the second grid are visible. Press PLAY.	503
10	Labels of the third grid are visible. Press PLAY.	503
11	All labels are visible. Press PLAY.	503
12	Standby LED is on. Press PLAY.	503
13	Display shows "FP DIMMER". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 15.	518
14	Display shows "DIMMING TEST". Wait until it is dimmed, and press than PLAY.	518
15	Display shows "FP KEYBOARD". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 17.	505
16	Display shows "LKB_0000 N 0". Press all keys at least one time. Press PLAY for a least one-second to exit this nucleus.	505
17	Display shows "FP REMOTE C". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 19.	506
18	Display shows "RC C_ N_ 0". Press at least one key of the remote control. Press PLAY to exit this nucleus.	506
19	Display shows "SCART-SW DVD". Press PLAY to execute this nucleus. Otherwise press NEXT.	1408
20	Display shows "COLOUR SETUP". Press PLAY to execute this nucleus. Otherwise press NEXT.	1406
21	Display shows "COLOUR-B ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	120
22	Display shows "PINKNOISE ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	115
23	Display shows "COLOUR-B OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	121
24	Display shows "PINKNOIS OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	116
25	Display shows "SINE ON". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 27.	117
26	Display shows "BUSY". To stop this nucleus, press STOP.	117
27	Display shows "SCART-S PASS". Press PLAY to execute this nucleus. Otherwise press NEXT.	1409
28	Display shows "BE RESET". Press PLAY to execute this nucleus. Otherwise press NEXT.	603
29	Display shows "BE VERSION". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 31.	602
30	Display shows the version of the basic engine. To stop this nucleus, press PLAY.	602
31	Display shows "BE TRAY OPEN". Press PLAY to execute this nucleus. Otherwise press NEXT.	616
32	Display shows "BE TRAY CLOSE". Press PLAY to execute this nucleus. Otherwise press NEXT.	615
33	Display shows "BE DVD LASER". Press PLAY to execute this nucleus. Otherwise press NEXT.	635
34	Display shows "BE CD LASER". Press PLAY to execute this nucleus. Otherwise press NEXT.	636
35	Display shows "BE LASER OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	637
36	Display shows "BE FOCUS ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	604
37	Display shows "BE FOCUS OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	605
38	Display shows "BE DISCM ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	606
39	Display shows "BE DISCM OFF". Press PLAY to execute this nucleus. Otherwise press NEXT.	607
40	Display shows "BE RADIAL ON". Press PLAY to execute this nucleus. Otherwise press NEXT.	608
41	Display shows "BE RADIAL OF". Press PLAY to execute this nucleus. Otherwise press NEXT.	609
42	Display shows "BE SLEDG OUT". Press PLAY to execute this nucleus. Otherwise press NEXT.	611
43	Display shows "BE SLEDGE IN". Press PLAY to execute this nucleus. Otherwise press NEXT.	610
44	Display shows "BE GROOVE IN". Press PLAY to execute this nucleus. Otherwise press NEXT.	612
45	Display shows "BE GROOV MID". Press PLAY to execute this nucleus. Otherwise press NEXT.	613
46	Display shows "BE GROOV OUT". Press PLAY to execute this nucleus. Otherwise press NEXT.	614
47	Display shows "BE RESET". Press PLAY to execute this nucleus. Otherwise press NEXT.	603
48	Display shows "BE TRAY OPEN". Press PLAY to execute this nucleus. Otherwise press NEXT.	616
49	Display shows "BE TRAY CLOSE". Press PLAY to execute this nucleus. Otherwise press NEXT.	615
50	Display shows "ERRORLOG". Press PLAY to execute this nucleus. Otherwise press NEXT and go to step 52.	404
51	Display shows the error codes. With the keys NEXT and PREV it is possible to step through the error codes. To stop this nucleus, press STOP.	404
52	Display shows "PASS", this means the Player Script is finished and the execution of the User Dealer Script is started in an endless loop. The execution of the User Dealer Script will only stop, when an error occurs. The Display shows the error code.	1

Remark
In case of failure, the display shows " FAIL 00000 ". The description of the shown error code can be retrieved in the survey of Nuclei Error Codes (paragraph 5.4). Once an error occurs, it is not possible to continue the player script. Switch off the set and restart the player script. By pressing the NEXT key, it is possible to jump over the failure and to continue the player script.


Switch player off.
Hold 2 keys <OPEN/CLOSE> + <STOP> simultaneously pressed and switch player on.
FRONTPANEL TEST
FP SEGMENT
PRESS <PLAY> TO START TEST
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
PRESS <PLAY> IF OK
PRESS <PREV> IF NOT OK
<NEXT>
FP LABEL
PRESS <PLAY> TO START TEST
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
PRESS <PLAY> IF OK
PRESS <NEXT> TO ABORT
LED
PRESS <PLAY> IF OK
PRESS <PREV> IF NOT OK
<NEXT>
FP DIMMER
PRESS <PLAY> TO START TEST
DIMMING TEST
DIMMING TEST
PRESS <PLAY> IF OK
PRESS <PREV> IF NOT OK
<NEXT>
FP KEYBOARD
PRESS <PLAY> TO START TEST
HEXADECIMAL KEY CODE
XX TIMES PRESSED
LKB_0000 N 0
PRESS ALL KEYS AT LEAST ONCE
SEE TABLE FOR KEY CODES
TO EXIT TEST:
PRESS <PLAY> MORE THAN 1S IF TEST IS OK
PRESS <PREV> MORE THAN 1S IF TEST IS NOT OK
<NEXT>
FP REMOTE C
PRESS <PLAY> TO START TEST
HEXADECIMAL RC-KEY-CODE
XX TIMES PRESSED
RC C_00 N_ 0
PRESS AT LEAST ONE KEY ON THE REMOTE CONTROL
SEE TABLE FOR RC KEY CODES
TO EXIT TEST: PRESS ONE OF FOLLOWING KEYS ON THE LOCAL KEYBOARD
PRESS <PLAY> IF TEST IS OK
PRESS <PREV> IS NOT OK
<NEXT>
DIGITAL BOARD TEST

FRONT KEY NAME	FRONT KEY CODE
PLAY	0200
PAUSE	0400
STOP	0800
OPEN/CLOSE	0008
AUDIO MODE	1000
REPEAT	4000
PREV	0004
NEXT	0002

RC KEY NAME	RC KEY CODE
TV POWER	ONLY FOR TV
SACD POWER	0C
STOP	31
SOUND MODE	50
PLAY	2C
REVERSE	29
PAUSE	30
SLOW	22
FORWARD	28
PREVIOUS	21
RESUME	D7
NEXT	20
MENU DISC	54
MENU SYSTEM	0F
UP	58
LEFT	5A
RIGHT	5B
DOWN	59
RETURN	83
OK	5C
ZOOM	F7
ANGLE	85
0	00
1	01
2	02
3	03
4	04
5	05
6	06
7	07
8	08
9	09
T	C9
C	CA
FTS	FB
SHUFFLE	1C
SUBTITLE	4B
AUDIO	4E
DIM	13
REPEAT	1D
REPEAT A-B	3B
SCAN	2A
VOL +	ONLY FOR TV
VOL -	ONLY FOR TV
CH +	ONLY FOR TV
CH -	ONLY FOR TV
MUTE	ONLY FOR TV

CL 06532152_008.eps
051200

Figure 5-2

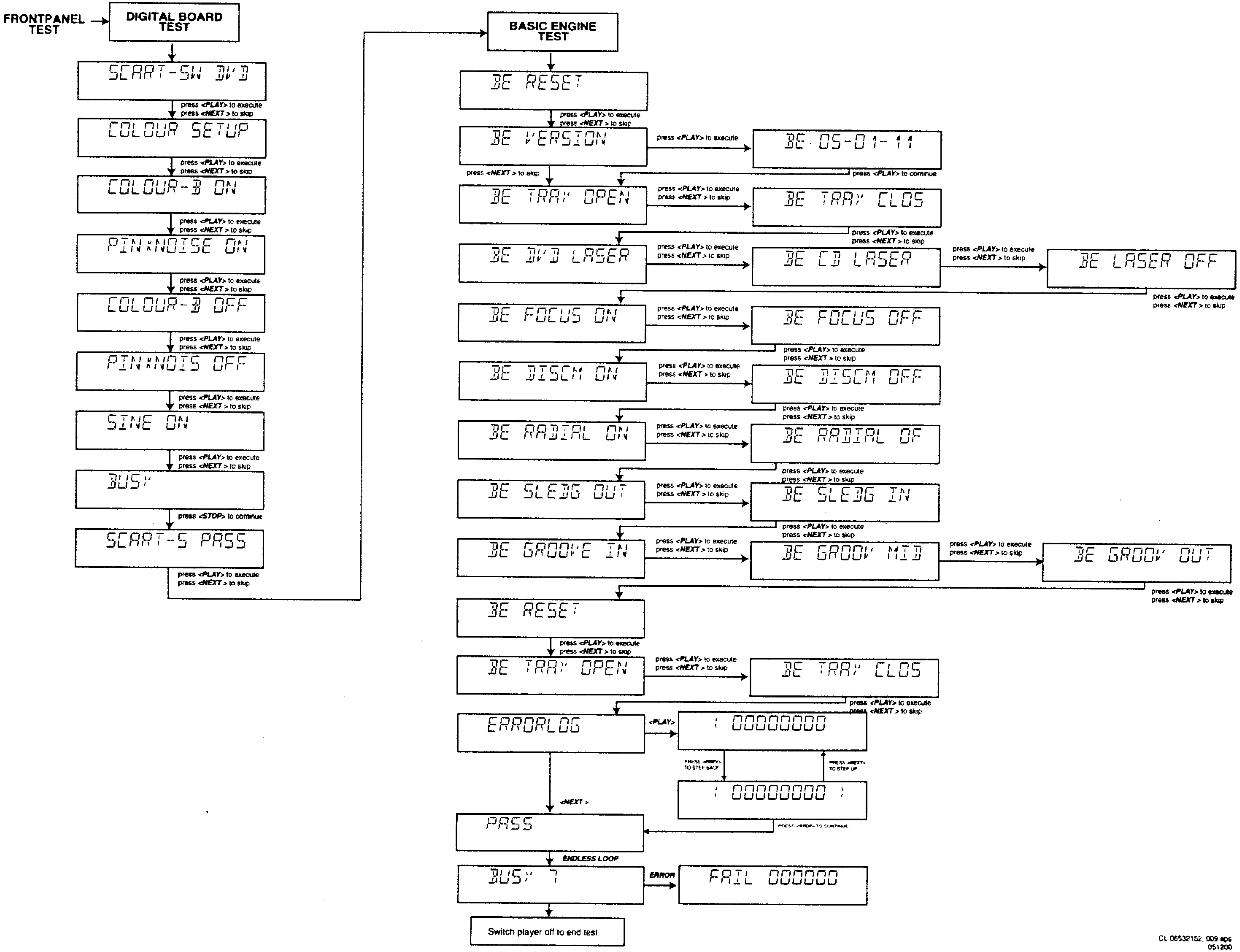

FRONTPANEL TEST
DIGITAL BOARD TEST
SCART-SW DVD
press <PLAY> to execute
press <NEXT> to skip
COLOUR SETUP
press <PLAY> to execute
press <NEXT> to skip
COLOUR-B ON
press <PLAY> to execute
press <NEXT> to skip
PINKNOISE ON
press <PLAY> to execute
press <NEXT> to skip
COLOUR-B OFF
press <PLAY> to execute
press <NEXT> to skip
PINKNOIS OFF
press <PLAY> to execute
press <NEXT> to skip
SINE ON
press <PLAY> to execute
press <NEXT> to skip
BUSY
press <STOP> to continue
SCART-S PASS
press <PLAY> to execute
press <NEXT> to skip
BASIC ENGINE TEST
BE RESET
press <PLAY> to execute
press <NEXT> to skip
BE VERSION
press <PLAY> to execute
BE 05-01-11
press <NEXT> to skip
press <PLAY> to continue
BE TRAY OPEN
press <PLAY> to execute
press <NEXT> to skip
BE TRAY CLOS
press <PLAY> to execute
press <NEXT> to skip
BE DVD LASER
press <PLAY> to execute
press <NEXT> to skip
BE CD LASER
press <PLAY> to execute
press <NEXT> to skip
BE LASER OFF
press <PLAY> to execute
press <NEXT> to skip
BE FOCUS ON
press <PLAY> to execute
press <NEXT> to skip
BE FOCUS OFF
press <PLAY> to execute
press <NEXT> to skip
BE DISCM ON
press <PLAY> to execute
press <NEXT> to skip
BE DISCM OFF
press <PLAY> to execute
press <NEXT> to skip
BE RADIAL ON
press <PLAY> to execute
press <NEXT> to skip
BE RADIAL OF
press <PLAY> to execute
press <NEXT> to skip
BE SLEDG OUT
press <PLAY> to execute
press <NEXT> to skip
BE SLEDG IN
press <PLAY> to execute
press <NEXT> to skip
BE GROOVE IN
press <PLAY> to execute
press <NEXT> to skip
BE GROOV MID
press <PLAY> to execute
press <NEXT> to skip
BE GROOV OUT
press <PLAY> to execute
press <NEXT> to skip
BE RESET
press <PLAY> to execute
press <NEXT> to skip
BE TRAY OPEN
press <PLAY> to execute
press <NEXT> to skip
BE TRAY CLOS
press <PLAY> to execute
press <NEXT> to skip
ERRORLOG
<PLAY>
(00000000
PRESS <PREV> TO STEP BACK
PRESS <NEXT> TO STEP UP
(00000000)
<NEXT>
PRESS <STOP> TO CONTINUE
PASS
ENDLESS LOOP
BUSY 7
ERROR
FAIL 000000
Switch player off to end test.
CL 06532152_009.eps
051200

Figure 5-3

5.2.3 Errorlog

Explanation:

The application errors will be logged in the NVRAM. The maximum number of error bytes that will be visible is 16. The first word (4 digits) of the byte is the component identification; the last word is the error code.

The diagnostics software will present a combination of this component identification plus an error code on the local display (and on the attached terminal). The last reported error is shown as < 00000000, the oldest visible error as 00000000> and the errors in between as < 00000000 >.

The devices that may report errors are the serial controller (UART), the basic engine (BE), the slave processor (SLPH), the SACD Stream Manager (SSM) and the SACD Media Access (SMA). The identification of these components is as follows:

Component name	Component identification
Serial controller (UART)	000A
Engine (BE)	0016
Slave Processor (SLPH)	001A
SACD Stream Manager (SSM)	001C
SACD Media Access (SMA)	002E
Diagnostic software (DS)	Dxxx

The tables in the next chapters list the error code and corresponding problem. The column 'Explanation' holds a more elaborate description and the most likely reason for the error.

Some examples:

002E0000 (SMA reported a timeout error

0016010A (Engine could not fully close or open the tray

D0010001 (Flash checksum failed (for other DS errors, see description of nucleui error codes in paragraph 5.4.

UART error codes

Error Number	Error name	Explanation
0000	BUF_OVERFLOW	To many characters were offered in too little time. Reason: system was too busy doing other jobs.
0001	COMMU-NICATION	Usually a protocol error. Reason: bad connection between engine and processor.

BE errors

Error Number	Error name	Explanation
0101	S2B_ILL_COMMAND	Parameter(s) not valid for this command. Reason: some communication problem between UART and engine.
0102	S2B_ILL_PARAM	Command not allowed in this state or unknown. Reason: see S2B_ILL_COMMAND error
0103	S2B_SLEDGE	Sledge could not be moved to home position.
0104	S2B_FOCUS	Focus failure
0105	S2B_MOTOR	Motor could not reach speed within timeout
0106	S2B_RADIAL	Servo didn't get on track after several retries.
0107	S2B_PLL_LOCK	PLL could not lock in Accessing or Tracking state
0108	SBC_HEADER_TO	Header timeout
0109	S2B_SBC_NOT_FOUND	Requested subcode item could not be found.
010A	S2B_TRAY	Tray could not be opened or closed completely.
010B	S2B_TOC_READ	TOC could not be read within timeout period.
010C	S2B_JUMP	Requested seek could not be performed.
010D	S2B_NON_EXIST_SES	Attempt to access a non-existing session.
010E	S2B_NON_EXIST_BCA	
01F0	S2B_OVERRUN	Too many bytes received over S2B Reason: see S2B_ILL_COMMAND error
01F1	S2B_COMM_TO	Not enough bytes are received over S2B Reason: see S2B_ILL_COMMAND error
01F2	S2B_PARITY	Byte received with parity error. Reason: see S2B_ILL_COMMAND error
01F3	S2B_ILL_PHASE	CMD IDC is not valid, transmission out of sync. Reason: see S2B_ILL_COMMAND error
01F4	S2B_ILL_NR_OF_BYTES	Byte count has an illegal value. Reason: see S2B_ILL_COMMAND error

SLPH error codes

Error Number	Error name	Explanation
0000	COMMUNI-CATION	Error in I2C communication. Reason: bad connection between slave processor and main processor.

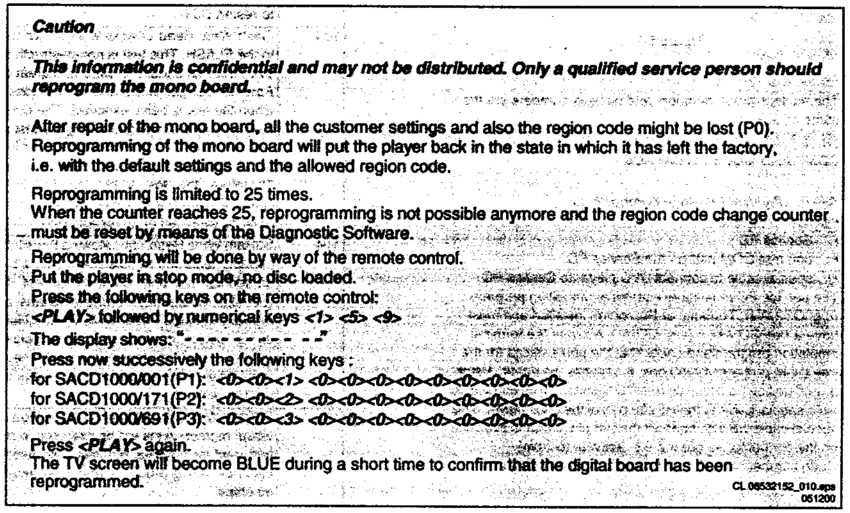
SSM error codes

Error Code	Error name	Explanation
0006	SP_SYNCERROR	System cannot get synchronised with sectors coming from disc. Reason: Usually a damaged disc or the player was dropped/pushed during operation. If not, the engine is malfunctioning.
0007	SP_EDCERROR	Data coming from disc is damaged. Reason: see SP_SYNCERROR
0008	SP_CONTINUITYERROR	Sequence of sectors coming from disc is incorrect. Reason: see SP_SYNCERROR
0009	DMX_CONTINUITYER-ROR	Sequence of sectors is incorrect. Reason: problem with buffer RAM
000A	LLD_ERROR	An illegal audio format was offered to the decoder. Reason: unknown audio type on disc or problem with buffer RAM
000B	BCU_ERROR	Internal problem in Furore chip

SMA error codes

Error Number	Error name	Explanation
0000	SMA_TIMEOUTERROR	Data coming from disc not in time. Reason: damaged disc or engine problem.

5.2.4 Reprogramming of region code



Caution

This information is confidential and may not be distributed. Only a qualified service person should reprogram the mono board.

After repair of the mono board, all the customer settings and also the region code might be lost (P0).
Reprogramming of the mono board will put the player back in the state in which it has left the factory,
i.e. with the default settings and the allowed region code.

Reprogramming is limited to 25 times.
When the counter reaches 25, reprogramming is not possible anymore and the region code change counter must be reset by means of the Diagnostic Software.

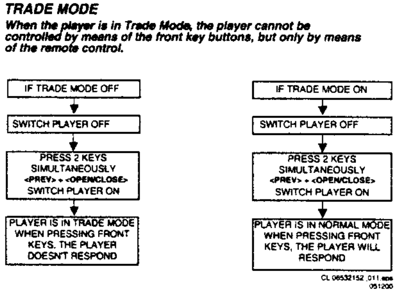
Reprogramming will be done by way of the remote control.
Put the player in stop mode, no disc loaded.
Press the following keys on the remote control:
<PLAY> followed by numerical keys *<1> <5> <9>*
The display shows: "- - - - - - - - - - -"
Press now successively the following keys :
for SACD1000/001(P1): *<0><0><1> <0><0><0><0><0><0><0><0><0>*
for SACD1000/171(P2): *<0><0><2> <0><0><0><0><0><0><0><0><0>*
for SACD1000/691(P3): *<0><0><3> <0><0><0><0><0><0><0><0><0>*

Press *<PLAY>* again.
The TV screen will become BLUE during a short time to confirm that the digital board has been reprogrammed.

CL 08532152_010.eps
051200

Figure 5-4

5.2.5 Trade mode



TRADE MODE

When the player is in Trade Mode, the player cannot be controlled by means of the front key buttons, but only by means of the remote control.

IF TRADE MODE OFF
SWITCH PLAYER OFF
PRESS 2 KEYS SIMULTANEOUSLY <PREV> + <OPEN/CLOSE> SWITCH PLAYER ON
PLAYER IS IN TRADE MODE WHEN PRESSING FRONT KEYS. THE PLAYER DOESN'T RESPOND
IF TRADE MODE ON
SWITCH PLAYER OFF
PRESS 2 KEYS SIMULTANEOUSLY <PREV> + <OPEN/CLOSE> SWITCH PLAYER ON
PLAYER IS IN NORMAL MODE WHEN PRESSING FRONT KEYS, THE PLAYER WILL RESPOND
CL 08532152_011.eps
051200

Figure 5-5

5.3 MENU AND COMMAND MODE INTERFACE

5.3.1 NUCLEI NUMERATION

Each nucleus has a unique number of four digits. This number is the input of the command mode.

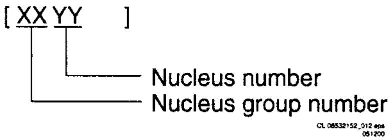


Figure 5-6

The following groups are defined:

Group number	Group name
0	Basic / Scripts
1	Host decoder (Sti5505 and memory)
2	Audio / video encoder (DVDR only)
3	VSM (DVDR only)
4	NVRAM
5	Front Panel
6	Basic Engine
7	Analogue board (DVDR only)
8	DVIO (DVDR only)
9	Loop nuclei (DVDR only)
10	Library sub nuclei (I2C nuclei)
11	User interface
12	Furore (SACD only)
13	DAC (SACD only)
14	Miscellaneous

5.3.2 ERROR HANDLING

Each nucleus returns an error code. This code contains six numerals, which means:

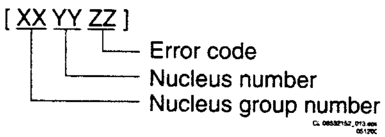


Figure 5-7

The nucleus group numbers and nucleus numbers are the same as above.

5.3.3 COMMAND MODE INTERFACE

Set-up physical interface components

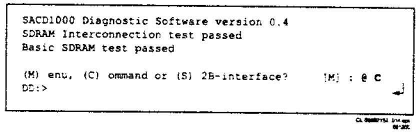
Hardware required:

- Service PC
- one free COM port on the Service PC
- special cable to connect DVD player to Service PC

The service PC must have a terminal emulation program (e.g. OS2 WarpTerminal or Procomm) installed and must have a free COM port (e.g. COM1). Activate the terminal emulation program and check that the port settings for the free COM port are: 19200 bps, 8 data bits, no parity, 1 stop bit and no flow control. The free COM port must be connected via a special cable to the RS232 port of the DVD player. This special cable will also connect the test pin, which is available on the connector, to ground (i.e. activate test pin).
Code number of PC interface cable: 3122 785 90017

Activation

Switch the player on and the following text will appear on the screen of the terminal (program):



```
SACD1000 Diagnostic Software version 0.4
SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?      [M] : @ C
DD:>
```

Figure 5-8

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing C has made a choice for Command Interface, the prompt ("DD>") will appear. The diagnostic software is now ready to receive commands. The commands that can be given are the numbers of the nuclei.

Command overview

The tables below give an overview of the commands.

Startup

[xx yy] Number	Nuclei
startup	Test the UART of the host decoder by sending a string to the UART.

Host Decoder Tests [01]

[xx yy] Number	Nuclei
100	Checksum Flash Checks the FLASH checksum.
101	Flash Write Access 1 Checks whether the first FLASH can be written. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
102	Flash Write Access 2 Checks whether the second FLASH can be written. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
103	Flash Write Read Checks whether we can write to the FLASH. This test is non-destructive. However, this test should be used with great caution. Potential danger exists when power loss occurs when the test is being executed. The contents of the NVRAM are changed during the test and are restored after the test. However, power loss may occur before the original contents are restored. Therefore, this test is not included in scripts. Check if Write enable pin of flash is high. The set must be switched off to restart DSW.
104	SdRam Write Read The following three individual memory tests will be executed: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
105	SdRam Write Read Fast The following two individual memory tests will be executed: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
106	Dram Write Read The following three individual memory tests will be executed: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring. Because the DRAM is not mounted in commercial sets, this test will result in a failure.
107	Dram Write Read Fast The following two individual memory tests will be executed: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips. Because the DRAM is not mounted in commercial sets, this test will result in a failure.
108	Version Displays the version number of the Sti5505.
109	Mute On Switches the audio mute of the monoboard on.
110	Mute Off Switches the audio mute of the monoboard off.
111	De-Emphasis On Switches the audio de-emphasis filter in the Sti5505 on.
112	De-Emphasis Off Switches the audio de-emphasis filter in the Sti5505 off.
113	Centre-On-Stereo Pin On Sets the PIO-pin Centre_on_stereo to '1'.
114	Centre-On-Stereo Pin Off Sets the PIO-pin Centre_on_stereo to '0'.
115	Pink Noise On Generates internally on the Sti5505 a pink noise audio signal that will be passed to all the DACs were it is converted to an analogue audio signal.
116	Pink Noise Off Switches off the pink noise audio signal generated with DS_HostdPinkNoiseOn.
117	Sine On Generates a sine signal of 1 kHz on the analogue output. The sine signal digital data are stored in the audio buffer in SDRAM, passed through the audio decoder and without any further processing to the audio DAC were it is converted to an analogue audio signal. To stop the sine, press the STOP key on the local keyboard.
118	Sine Burst 1kHz Generates a sine signal of 1 kHz on the analogue output that lasts about four seconds. The generation of the signal is the same as in DS_HostdSineOn.
119	Sine Burst 12kHz Generates a sine signal of 12kHz on the analogue output that lasts about four seconds. The generation of the signal is the same as in DS_HostdSineOn.
120	Colour-bar On Enables colour bar in the DENC in the Sti5505. To make the colourbar visible on the TV screen via the SCART output, the following commands must also be given: 1406: Colour Setup Normal 1408: Scart Switch DVD
121	Colour-bar Off Disables colour bar in the DENC in the Sti5505.
122	NvramWrR Checks the NVRAM by writing and reading patterns to and from all locations. This test is non-destructive. However, this test should be used with great caution. Potential danger exists when power loss occurs when the test is being executed. The contents of the NVRAM are changed during the test and are restored after the test. However, power loss may occur before the original contents are restored. Therefore, this test is not used in script and menu mode.
123	NvramI2c Checks the interconnection between the I2C controller on the STi5505 and the NVRAM.
124 125 126 127 128 129	Pink Noise On Channel X Generates internally on the Sti5505 a pink noise audio signal that will be passed to the DACs on the DAC board where it is converted to an analogue audio signal. Only one channel at the time will generate a pink noise audio signal. X indicates a channel number. It can be turned off with the nucleus 116. 124 = ch1, ... ,29 = ch6

NVRAM Tests [04]

[xx yy] Number	Nuclei
400	Resets the NVRAM. After the reset of the NVRAM, nucleus 404 will give error 40402: "NVRAM error log is invalid". Introducing an error can rectify this. (E.g. playing a disc upside down). To reset the error log, it is recommended to use nucleus 407.
404	Line1 Error Log Reads the error log from NVRAM. The information is displayed on the local display and is send to the serial port. With the PREV and NEXT key it is possible to step through the logging information on the local display. The STOP key is used to exit this nucleus at any time.
405	Line1 Lifetime Log Ends the lifetime log. The information is displayed on the local display and is send to the serial port. The following statistics will be read from the NVRAM: Power On Time. The time in hours that the SACD player was turned on. Playing Time CDDA and VCD. The time in hours that the disc has been spinning summed up for both playing CDDA and VCD discs. Playing Time DVD. Like above but for DVD discs. Times Tray Open. The total number of times the tray has been opened. With the PREV and NEXT key it is possible to step through the logging information on the local display. The STOP key is used to exit this nucleus at any time.
406	Line1 Application Version Reads the version of the application software from a fixed location in the NVRAM.
407	Line2 Error Log Reset Resets the error log.
408	Line2 Lifetime Log Reset Resets the lifetime log.
409	Line2 Region-Code Reset Resets the region code change counter of the SACD player.

Front Panel Tests [05]

[xx yy] Number	Nuclei
500	Echo Checks the interface between the SACD Monoboard and the slave processor on the front panel by sending an 'echo' command. The I2C connection will be tested.
501	Version Returns the ROM software version and internal ID of the slave processor of the front panel.
502	Segment Checks the local display by lighting four test patterns. The following test patterns are: Show a starburst Light all horizontal segments Light all vertical segments Light all segments User confirmation is necessary after each test pattern.
503	Label Checks the local display and LED of the front panel by lighting all labels and LED in five steps: Light the first label grid. Light the second label grid. Light the third label grid. Light all label grids. Light the LED. User confirmation is necessary after each test pattern.
504	Led Switches the LED on. User confirmation is necessary.
505	Keyboard Checks the local keyboard. The local display gives feedback on the keys that are pressed by showing their code: [LKB_xxxx N_yy]. [xxxx] Means the key-code and is hexadecimal. [yy] means the number of times this key was pressed. All keys must be tested. User confirmation is necessary at the end of the test. However, the PLAY, PREV and NEXT keys are also part of the keyboard test itself. Therefore it is needed to press these keys for one second.
506	Remote-Control Checks the interface between the remote control and the front panel. The local display gives feedback on the remote key that is pressed by showing its code: [RC C_xx N_yy]. [xx] Means the RC-key-code and is hexadecimal. [yy] means the number of times a RC-key was pressed. At least one key must be tested. User confirmation is necessary. The PLAY key confirms that at least one RC-key is tested.
518	Dimmer Dimming test of Display

User confirmation is necessary during the front panel tests. The following keys are used for user feedback:

PLAY for confirming that the test is correct. PREV when the test is not ok. NEXT is pressed in order to abort to the nucleus at any time; the nucleus is not tested successfully. The confirmation can also be send through the serial port for automated verification. Character 'o' means 'ok'; character 'n' means that this nucleus must be aborted; the nucleus is not tested successfully. Any other key will fail the test.

Basic Engine Tests [06]

[xx yy] Number	Nuclei
600	S2B Pass Switch the RS232 port and the S2B port in pass-through mode. The only way to exit this nucleus is via a power off of the player.
601	S2Bengine Checks the S2B interface with the Basic Engine by sending an 'echo' command.
602	Version Returns the version number of the Basic Engine. The version number will also be displayed on the local display. The PLAY key is used to exit this nucleus.
603	Reset Resets the Basic Engine.
604	Focus On Puts the laser of the BE into focus (focus loop).
605	Focus Off Switches the focus loop off.
606	Disc Motor On Switches the disk motor (= spindle motor) on.
607	Disc Motor Off Switches the disk motor (= spindle motor) off.
608	Radial On Closes the radial loop.
609	Radial Off Opens the radial loop.
610	Sledge In Moves the sledge fully inwards.
611	Sledge Out Moves the sledge fully outwards.
612	Grooves In Lets the laser spot jump to the inside limit the disc.
613	Grooves Mid Lets the laser spot jump to the middle of the disc.
614	Grooves Out Let's the laser spot jump to the outside of the disc.
615	Tray In Closes the disc tray.
616	Tray Out Opens the disc tray.
635	DVD Laser On Switches the DVD laser of the BE on.
636	CD Laser On Switches the CD laser of the BE on.
637	Lasers Off Switches the lasers off.

Furore Tests [12]

[xx yy] Number	Nuclei
1200	Write Read SDRam Low The following three individual memory tests will be executed at the lower FURORE SDRAM: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
1201	Write Read SDRam High The following three individual memory tests will be executed at the higher FURORE SDRAM: a data bus test, an address bus test, and a device test. The first two test for electrical wiring problems and improperly inserted chips, while the third is intended to detect missing chips and catastrophic failures. As an unintended consequence, the device test will also uncover problems with the control bus wiring.
1202	Write Read Fast SDRam Low The following two individual memory tests will be executed at the lower FURORE SDRAM: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
1203	Write Read Fast SDRam High The following two individual memory tests will be executed at the higher FURORE SDRAM: a data bus test, and an address bus test. The two test for electrical wiring problems and improperly inserted chips.
1204	Id Gets the revision ID of the FURORE chip.

DAC Board Tests [13]

[xx yy] Number	Nuclei
1300	I2C Checks the interface between the I2C controller on the Hostdecoder and the DAC board.
1301	I2C Enable Enables the I2C interface.
1302	I2C Disable Disables the I2C interface.
1303	Reset Resets the DAC board.
1304	Filter SACD Selects the SACD output filters for the DACs.
1305	Filter Non-SACD Selects the non-SACD output filters for the DACs.
1306	Clock Internal Selects the internal clock of 384 * Fs. (in 44.1kHz mode)
1307	Clock External Selects the external clock. (in non 44.1 kHz mode)
1308	Mute On Switches the mute of the DAC board on.
1309	Mute Off Switches the mute of the DAC board off.
1310	Mode CDDA Switches the DACs into CDDA mode.
1311	Mode DVD48 Switches the DACs into DVD 48 kHz mode.
1312	Mode DVD96 Switches the DACs into DVD96 kHz mode.
1313	Mode DSD Switches the DACs into DSD mode.
1314	Clock Frequency SACD Selects the DAC master clock MCLK for SACD = 384Fs
1315	Clock Frequency CDDA Selects the DAC master clock MCLK for CDDA = 192Fs

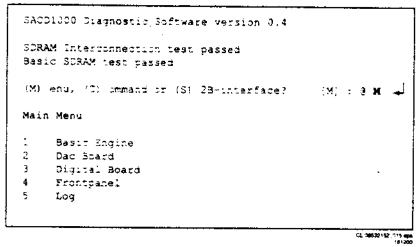
Miscellaneous Tests [14]

[xx yy] Number	Nuclei
1400	Clock 11.289 MHz Switches clock A_CLK from the microclock to 11.2896 MHz.
1401	Clock 12.288 MHz Switches clock A_CLK from the microclock to 12.288 MHz.
1402	Clock 24.576 MHz Switches clock A_CLK from the microclock to 24.576 MHz.
1403	Colour Setup I2C Checks the I2C interface with the RGB video processor on the Audio/Video.
1404	Colour Setup High Sets the RGB setting to a high value, changing the intensity.
1405	Colour Setup Low Sets the RGB setting to a low value, changing the intensity.
1406	Colour Setup Normal Sets the RGB setting to a normal value, changing the intensity.
1407	Scart Switch I2C Checks the I2C interface with the scart switch on the Audio/Video board.
1408	Scart Switch Dvd Sets the switch IC on the Audio/Video board to give DVD signal.
1409	Scart Switch Pass Sets the scart IC on the Audio/Video board to pass-through the aux. scart input.
1410	Scart Low Steers pin 16 on the scart connector with the value low (0 to 2 V).
1411	Scart Medium Steers pin 16 on the scart connector with the value medium (4.5 to 7 V).

5.3.4 MENU MODE INTERFACE

Activation

Switch the player on and the following text will appear on the screen of the terminal (program):



```
SACD1000 Diagnostic Software version 0.4

SDRAM Interconnection test passed
Basic SDRAM test passed

(M) enu, (C) ommand or (S) 2B-interface?     [M] : @ M

Main Menu

1     Basic Engine
2     Dac Board
3     Digital Board
4     Frontpanel
5     Log
```

Figure 5-9

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Menu structure

The following menu structure is given after starting up the SACD1000 player in menu mode. The symbol → indicates that the current menu choice will invoke the display of a submenu. The number between [ ] mean the nucleus number. These numbers will not be shown on the screen.

Main Menu

1. Basic Engine	→
2. Dac Board	→
3. Digital Board	→
4. Front panel	→
5. Log	→

Basic Engine Menu

1. Disc Motor	→
2. Focus	→
3. Grooves	→
4. Laser	→
5. Radial	→
6. Sledge	→
7. Tray	→
8. Reset	[603]
9. S2B Pass	[600]
10. S2B Echo	[601]
11. Version	[602]

Disc Motor Menu

1. On	[606]
2. Off	[607]

Focus Menu

1. On	[604]
2. Off	[605]

Grooves Menu

1. Inside of the Disc	[612]
2. Middle of the Disc	[613]
3. Outside of the Disc	[614]

Laser Menu

1. DVD Laser On	[635]
2. CD Laser On	[636]
3. Lasers Off	[637]

Radial Menu

1. On	[608]
2. Off	[609]

Sledge Menu

1. Move Inwards	[610]
2. Move Outwards	[611]

Tray Menu

1. Open	[616]
2. Close	[615]

DAC Board Menu

1. Clock	→
2. DAC Mode	→
3. Filter SACD	→
4. I2C	→
5. Mute	→
6. Reset	[1303]

DAC Clock Menu

1. Clock Internal	[1306]
2. Clock External	[1307]
3. Clock Frequency SACD	[1314]
4. Clock Frequency CDDA	[1315]

DAC Mode Menu

1. Mode CDDA	[1310]
2. Mode DVD48	[1311]
3. Mode DVD96	[1312]
4. Mode DSD	[1313]

DAC Filter Menu

1. Filter SACD	[1304]
2. Filter Non-SACD	[1305]

DAC IIC Menu

1. I2C Test	[1300]
2. I2C Enable Pin On	[1301]
3. I2C Enable Pin Off	[1302]

DAC Mute Menu

1. Mute On	[1308]
2. Mute Off	[1309]

Digital Board Menu

1. Furore	→
2. Host Decoder	→
3. Miscellaneous	→

Furore Menu

1. SDRAM Write/Read High	[1201]
2. SDRAM Write/Read Low	[1200]
3. SDRAM Write/Read Fast High	[1203]
4. SDRAM Write/Read Fast Low	[1202]
5. Version	[1204]

Host Decoder Menu

1. Audio Mute	→
2. Centre On Stereo	→
3. Colourbar	→
4. De-Emphasis	→

5.	Pink Noise	→
6.	Sine Generate	→
7.	Digital Board Version	[108]
8.	Flash Checksum	[100]
9.	Flash1 Write Access	[101]
10.	Flash2 Write Access	[102
11.	Flash Write/Read	[103]
12.	Host SDRAM Write/Read	[104]
13.	Host SDRAM Write/Read Fast	[105]
14.	Host DRAM Write/Read	[106]
15.	Host DRAM Write/Read Fast	[107]
16.	NVRAM I2C	[123]
17.	NVRAM Write/Read	[122]

Audio Mute Menu

1.	Audio Mute On	[109]
2.	Audio Mute Off	[110]

Centre On Stereo Menu

1.	Centre-On-Stereo Pin On	[113]
2.	Centre-On-Stereo Pin Off	[114]

Colourbar Menu

1.	Colourbar On	[120]
2.	Colourbar Off	[121]

De-Emphasis Menu

1.	De-Emphasis On	[111]
2.	De-Emphasis Off	[112]

Pink Noise Menu

1.	Pink Noise On	[115]
2.	Pink Noise On Channel 1	[124]
3.	Pink Noise On Channel 2	[125]
4.	Pink Noise On Channel 3	[126]
5.	Pink Noise On Channel 4	[127]
6.	Pink Noise On Channel 5	[128]
7.	Pink Noise On Channel 6	[129]
8.	Pink Noise Off	[116]

Sine Generate Menu

1.	Sine On	[117]
2.	Sine Burst 1kHz	[118]
3.	Sine Burst 12kHz	[119]

Miscellaneous Menu

1.	Clock 11.289 MHz	[1400]
2.	Clock 12.288 MHz	[1401]
3.	Clock 24.576 MHz	[1402]
4.	Colour Setup I2C	[1403]
5.	Colour Setup High	[1404]
6.	Colour Setup Low	[1405]
7.	Colour Setup Normal	[1406]
8.	Scart Pin Low	[1410]
9.	Scart Pin Medium	[1411]
10.	Scart Switch I2C	[1407]
11.	Scart Switch DVD	[1408]
12.	Scart Switch Pass	[1409]

Front Panel Menu

1.	Echo	[500]
2.	Dimmer	[618]
3.	Light Labels	[503]
4.	Led Test	[504]
5.	Keyboard	[506]
6.	Remote Control	[506]
7.	Segment Test	[502]

Log Menu

1.	Application Version Read	[406]
2.	Error Log Read	[404]
3.	Error Log Reset	[407]
4.	Lifetime Log Read	[405]

5.4 Nuclei Error Codes

In the following tables the error description of the error codes will be described.

5.4.1 Host Decoder Nuclei

Error code	Error description
10000	Test succeeded.
10001	Test failed, checksum is wrong.
10100	Test succeeded.
10101	FLASH 1 Write access test failed.
10200	Test succeeded.
10201	FLASH 2 Write access test failed.
10300	Test succeeded.
10301	FLASH write test failed.
10302	FLASH write command failed.
10303	FLASH write test done max. number of times.
10400	Memory tests succeeded.
10401	Memory databus test goes wrong at wire dy.
10402	Memory addressbus test goes wrong at wire ay.
10403	Physical memory device test goes wrong at address 0xYYYYYYYY.
10500	Memory tests succeeded.
10501	Memory databus test goes wrong at wire dy.
10502	Memory addressbus test goes wrong at wire ay.
10503	Physical memory device test goes wrong at address 0xYYYYYYYY.
10600	Memory tests succeeded.
10601	Memory databus test goes wrong at wire dy.
10602	Memory addressbus test goes wrong at wire ay.
10603	Physical memory device test goes wrong at address 0xYYYYYYYY.
10700	Memory tests succeeded.
10701	Memory databus test goes wrong at wire dy.
10702	Memory addressbus test goes wrong at wire ay.
10703	Physical memory device test goes wrong at address 0xYYYYYYYY.
10800	Test succeeded.
10900	Test succeeded.
10901	Muting audio test failed.
11000	Test succeeded.
11001	Demuting audio test failed.
11100	Test succeeded.
11200	Test succeeded.
11300	Test succeeded.
11400	Test succeeded.
11500	Test succeeded.
11501	Set-up of I2C failed.
11502	The selection of the clock source failed.
11504	The demute of the audio failed.
11600	Test succeeded.
11601	Set-up of I2C failed.
11602	The mute of the audio failed.
11700	Test succeeded.
11701	Set-up of I2C failed.
11702	The mute of the audio failed.
11703	The demute of the audio failed.
11704	The selection of the clock source failed.
11707	Set-up of front panel failed.
11708	Front panel keyboard access failed.
11800	Test succeeded.
11801	Set-up of I2C failed.
11802	The mute of the audio failed.
11803	The demute of the audio failed.
11804	The selection of the clock source failed.
11900	Test succeeded.
11901	Set-up of I2C failed.
11902	The mute of the audio failed.
11903	The demute of the audio failed.
11904	The selection of the clock source failed.
12000	Test succeeded.
12100	Test succeeded.
12200	Test succeeded.
12201	I2C bus busy before start.
12202	NVRAM I2C access time-out.
12203	No NVRAM I2C access acknowledge.
12204	NVRAM I2C access time-out.
12205	NVRAM I2C Write/Read back failed.
12300	Test succeeded.
12301	I2C bus busy before start.
12302	NVRAM I2C read access time-out.
12303	No NVRAM I2C read acknowledge.
12304	NVRAM I2C read failed.
12400	Test succeeded.
12401	Test failed.
12500	Test succeeded.
12501	Test failed.
12600	Test succeeded.
12601	Test failed.
12700	Test succeeded.
12701	Test failed.
12800	Test succeeded.
12801	Test failed.
12900	Test succeeded.
12901	Test failed.

5.4.2 NVRAM Nuclei

Error code	Error description
40000	Test succeeded.
40001	I2C access failed.
40100	Test succeeded.
40101	I2C access failed.
40102	Invalid input.
40200	Test succeeded.
40201	I2C access failed.
40202	Invalid input.
40400	Test succeeded.
40401	I2C access failed.
40402	Errorlog in NVRAM is corrupt.
40403	Front panel access failed.
40500	Test succeeded.
40501	I2C access failed.
40502	Front panel access failed.
40600	Test succeeded.
40601	I2C access failed.
40700	Test succeeded.
40701	I2C access failed.
40800	Test succeeded.
40801	I2C access failed.
40900	Test succeeded.
40901	I2C access failed.

5.4.3 Front Panel Nuclei

Error code	Error description
50000	Test succeeded.
50001	I2C bus busy.
50002	I2C read access time-out.
50003	No I2C read acknowledges.
50004	I2C read failed.
50005	I2C write access time-out.
50006	No I2C write acknowledges.
50007	I2C write failed.
50008	No echo response from front panel.
50100	Test succeeded.
50101	I2C connection failed.
50200	Test succeeded.
50201	I2C connection failed.
50202	Test failed.
50300	Test succeeded.
50301	I2C connection failed.
50302	Test failed.
50400	Test succeeded.
50401	I2C connection failed.
50402	Test failed.
50500	Test succeeded.
50501	I2C connection failed.

Error code	Error description
50502	Test failed.
50504	Not all keys were pressed.
50600	Test succeeded.
50601	I2C connection failed.
50602	Test failed.
51800	Test succeeded.
51806	I2C connection failed.
51807	Test failed.

5.4.4 Basic Engine Nuclei

Error code	Error description
60000	Test succeeded.
60100	Test succeeded.
60101	Basic Engine returned error number 0xXX.
60102	Parity error from Basic Engine to Serial.
60103	Communication time-out error.
60104	Unexpected response from Basic Engine.
60105	Echo loop could not be closed.
60106	Wrong echo pattern received.
60200	Test succeeded.
60201	Basic Engine returned error number 0xXX.
60202	Parity error from Basic Engine to Serial.
60203	Communication time-out error.
60204	Unexpected response from Basic Engine.
60300	Test succeeded.
60301	Basic-Engine time-out error.
60400	Test succeeded.
60401	Basic Engine returned error number 0xXX.
60402	Parity error from Basic Engine to Serial.
60403	Communication time-out error.
60404	Unexpected response from Basic Engine.
60405	Focus loop could not be closed.
60500	Test succeeded.
60501	Basic Engine returned error number 0xXX.
60502	Parity error from Basic Engine to Serial.
60503	Communication time-out error.
60504	Unexpected response from Basic Engine.
60600	Test succeeded.
60601	Basic Engine returned error number 0xXX.
60602	Parity error from Basic Engine to Serial.
60603	Communication time-out error.
60604	Unexpected response from Basic Engine.
60700	Test succeeded.
60701	Basic Engine returned error number 0xXX.
60702	Parity error from Basic Engine to Serial.
60703	Communication time-out error.
60704	Unexpected response from Basic Engine.
60800	Test succeeded.
60801	Basic Engine returned error number 0xXX.
60802	Parity error from Basic Engine to Serial.
60803	Communication time-out error.
60804	Unexpected response from Basic Engine.
60805	Radial loop could not be closed.
60900	Test succeeded.
60901	Basic Engine returned error number 0xXX.
60902	Parity error from Basic Engine to Serial.
60903	Communication time-out error.
60904	Unexpected response from Basic Engine.
61000	Test succeeded.
61001	Basic Engine returned error number 0xXX.
61002	Parity error from Basic Engine to Serial.
61003	Communication time-out error.
61004	Unexpected response from Basic Engine.
61100	Test succeeded.
61101	Basic Engine returned error number 0xXX.
61102	Parity error from Basic Engine to Serial.
61103	Communication time-out error.
61104	Unexpected response from Basic Engine.
61200	Test succeeded.
61201	Basic Engine returned error number 0xXX.
61202	Parity error from Basic Engine to Serial.
61203	Communication time-out error.
61204	Unexpected response from Basic Engine.
61300	Test succeeded.
61301	Basic Engine returned error number 0xXX.
61302	Parity error from Basic Engine to Serial.
61303	Communication time-out error.
61304	Unexpected response from Basic Engine.
61400	Test succeeded.
61401	Basic Engine returned error number 0xXX.
61402	Parity error from Basic Engine to Serial.
61403	Communication time-out error.
61404	Unexpected response from Basic Engine.
61500	Test succeeded.
61501	Basic Engine returned error number 0xXX.
61502	Parity error from Basic Engine to Serial.
61503	Communication time-out error.
61504	Unexpected response from Basic Engine.
61600	Test succeeded.
61601	Basic Engine returned error number 0xXX.
61602	Parity error from Basic Engine to Serial.
61603	Communication time-out error.
61604	Unexpected response from Basic Engine.
63500	Test succeeded.
63501	Basic Engine returned error number 0xXX.
63502	Parity error from Basic Engine to Serial.
63503	Communication time-out error.
63504	Unexpected response from Basic Engine.
63600	Test succeeded.
63601	Basic Engine returned error number 0xXX.
63602	Parity error from Basic Engine to Serial.
63603	Communication time-out error.
63604	Unexpected response from Basic Engine.
63700	Test succeeded.
63701	Basic Engine returned error number 0xXX.
63702	Parity error from Basic Engine to Serial.
63703	Communication time-out error.
63704	Unexpected response from Basic Engine.

5.4.5 Furore Nuclei

Error code	Error description
120000	Test succeeded.
120001	Memory databus test goes wrong at wire dy.
120002	Memory addressbus test goes wrong at wire ay.
120003	Physical memory device test goes wrong at address 0xYYYYYYYY.
120100	Test succeeded.
120101	Memory databus test goes wrong at wire dy.
120102	Memory addressbus test goes wrong at wire ay.
120103	Physical memory device test goes wrong at address 0xYYYYYYYY.
120200	Test succeeded.
120201	Memory databus test goes wrong at wire dy.
120202	Memory addressbus test goes wrong at wire ay.
120203	Physical memory device test goes wrong at address 0xYYYYYYYY.
120300	Test succeeded.
120301	Memory databus test goes wrong at wire dy.
120302	Memory addressbus test goes wrong at wire ay.
120303	Physical memory device test goes wrong at address 0xYYYYYYYY.
120400	Test succeeded.

5.4.6 DAC Nuclei

Error code	Error description
130000	Test succeeded.
130001	I2C bus busy before start.
130011	I2C I/O expander bus busy.
130012	I2C I/O expander read access time-out.
130013	I2C I/O expander no read acknowledge.
130014	I2C I/O expander read failed.
130015	I2C I/O expander write access time-out.
130016	I2C I/O expander no write acknowledge.
130017	I2C I/O expander write failed.
130018	I2C I/O expander failed.
130021	I2C DAC_LR device bus busy.
130022	I2C DAC_LR device read access time-out.
130023	I2C DAC_LR device no read acknowledge.
130024	I2C DAC_LR device read failed.
130025	I2C DAC_LR device write access time-out.
130026	I2C DAC_LR device no write acknowledge.
130027	I2C DAC_LR device write failed.
130028	I2C DAC_LR device failed.
130031	I2C DAC_LSRS device bus busy.
130032	I2C DAC_LSRS device read access time-out.
130033	I2C DAC_LSRS device no read acknowledge.
130034	I2C DAC_LSRS device read failed.
130035	I2C DAC_LSRS device write access time-out.
130036	I2C DAC_LSRS device no write acknowledge.
130037	I2C DAC_LSRS device write failed.
130038	I2C DAC_LSRS device failed.
130041	I2C DAC_CLFE device bus busy.
130042	I2C DAC_CLFE device read access time-out.
130043	I2C DAC_CLFE device no read acknowledge.
130044	I2C DAC_CLFE device read failed.
130045	I2C DAC_CLFE device write access time-out.
130046	I2C DAC_CLFE device no write acknowledge.
130047	I2C DAC_CLFE device write failed.
130048	I2C DAC_CLFE device failed.
130100	Test succeeded.
130200	Test succeeded.
130300	Test succeeded.
130301	I2C bus busy before start.
130302	I2C access failed.
130400	Test succeeded.
130401	I2C bus busy before start.
130402	I2C access failed.
130500	Test succeeded.
130501	I2C bus busy before start.
130502	I2C access failed.
130600	Test succeeded.
130601	I2C bus busy before start.
130602	I2C access failed.
130700	Test succeeded.
130701	I2C bus busy before start.
130702	I2C access failed.
130800	Test succeeded.
130801	I2C bus busy before start.
130802	I2C access failed.
130900	Test succeeded.
130901	I2C bus busy before start.
130902	I2C access failed.
131000	Test succeeded.
131001	I2C bus busy before start.
131002	I2C access failed.
131100	Test succeeded.
131101	I2C bus busy before start.
131102	I2C access failed.
131200	Test succeeded.
131201	I2C bus busy before start.
131202	I2C access failed.

Error code	Error description
131300	Test succeeded.
131301	I2C bus busy before start.
131302	I2C access failed.
131400	Test succeeded.
131401	I2C bus busy before start.
131402	I2C access failed.
131500	Test succeeded.
131501	I2C bus busy before start.
131502	I2C access failed.

5.4.7 Miscellaneous Nuclei

Error code	Error description
140000	Test succeeded.
140001	I2C access failed.
140100	Test succeeded.
140101	I2C access failed.
140200	Test succeeded.
140300	Test succeeded.
140301	I2C bus busy.
140302	I2C device write access time-out.
140303	I2C device no write acknowledge.
140304	I2C device write failed.
140400	Test succeeded.
140401	I2C bus busy before start.
140402	I2C access failed.
140403	Setup of SCART switch failed.
140500	Test succeeded.
140501	I2C bus busy before start.
140502	I2C access failed.
140503	Setup of SCART switch failed.
140600	Test succeeded.
140601	I2C bus busy before start.
140602	I2C access failed.
140603	Setup of SCART switch failed.
140700	Test succeeded.
140701	I2C bus busy.
140702	I2C device read access time-out.
140703	I2C device no read acknowledge.
140704	I2C device read failed.
140800	Test succeeded.
140801	Setup of ColourSetup chip failed.
140802	I2C device write failed.
140900	Test succeeded.
140901	Setup of ColourSetup chip failed.
140902	I2C device write failed.
140903	I2C device read failed.
141000	Test succeeded.
141100	Test succeeded.

5.5 Test instructions SACD mono board

5.5.1 General

- Impedance of measuring-equipment should be > 1M(.
- Most tests have to be done by software commands. Together with the software command you will find a Ref.# nbr. This is the number of the diagnostic nucleus used for this test. More detailed information can be found in the description of the command mode interface.
- Levels: Most measurements are digital measurements. The high and low levels in this document got to have next specification: low : < 0.3V (LVTTL) high : > 3.0V (LVTTL) LOW : < 0.4V (TTL) HIGH: > 4.5V (TTL)
- All voltages marked with "stby" have to stay on during standby.
- Because all clocks are derived from the SACD clock (384FS_in) from the DAC board, this board should always be connected to the mono board.
- The linear power supply is switched on/off by the STB_OUT signal from the mono board to the DAC board.

5.5.2 General start-up measurements

Supply check:
Measure the voltages on the pins of the connector 1600 with a multimeter.

pin	TP	Signal_name	Voltage
1600-1	F604	+3V3	+3V3
1600-2	F604	+3V3	+3V3
1600-3	F631	+5V	+5V (0V during standby)
1600-4	F614	+5Vstby	+5V
1600-5	F615	+6Vstby	+6V
1600-6	F623	GND	0V
1600-7	F623	GND	0V
1600-8	F623	GND	0V
1600-9	F618	-8Vstby	-8V
1600-10	F634	STB_CONT	0V (+5V during standby)
1600-11	F636	+12Vstby	+12V
1600-12	F623	GND	0V
1600-13	F675	PWR_FAIL	+2.1V (1.4V during standby)

Also check the following power supplies:
Testpoint F608: +3V3 (5%. (Check IC7605 in case of failure)
Testpoint F632: +3V3 (5%. (Check IC7622 in case of failure)
Testpoint F101: +9V (5%. (Check IC7109 in case of failure)

Check the supply currents to be sure that there are no major failures on the board.
Measure the currents flowing toward the mono board using a Tektronix AM503B current probe on the wires between the switch mode power supply and the connector 1600.

pin	TP	Signal_name	measured
1600-1	F605	+3V3	560 mA
1600-2	F605	+3V3	
1600-3	F631	+5V	510 mA
1600-4	F614	+5Vstby	2 mA
1600-5	F615	+6Vstby	< 1 mA
1600-6	F623	GND	
1600-7	F623	GND	
1600-8	F623	GND	
1600-9	F618	-8Vstby	54 mA
1600-10	F634	STB_CONT	
1600-11	F636	+12Vstby	90 mA
1600-12	F623	GND	
1600-13	F675	PWR_FAIL	

5.5.3 Reset circuitry

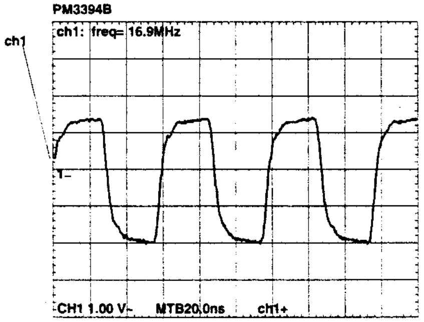
Reset of Sti5505:
In power down mode STB_CONT is high; the clock is disabled in order to reduce the power consumption. When STB_CONT goes low, STB_CONTD goes high and enables the 27 MHz clock.
Check that this clock is present and stable before the RESETn is de-asserted. RESETn is a signal, which allows initialising the main processor. We check also that when going from ON mode to stand-by mode, the 27 MHz is held for a certain moment after RESETn is asserted.

Reset of Servo:
The reset for the Servo circuit is given on Power On to the MACE IC 7207 with POR via C2215, R3234 and D6200. The reset signals STB_DALAS for DALAS and PORN for HD61are generated by MACE IC.
When POR is not working (due to a hang-up situation), an extra reset signal RSTN, coming from the Sti5505 will wake up the Servo circuit.

5.5.4 Clock check

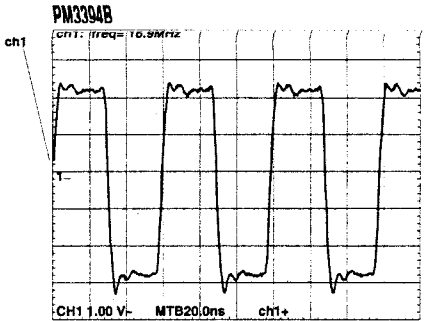
The source clock comes from the DAC board. The SACD CLK is a master clock from which all the other clocks are derived. If this one is not present the system cannot start and work.
The SACD power supply, the mono board and the DAC board should be connected together. On power up the clocks appear on the board. All clocks to be measured have a 0.02% tolerance.

Clockname	Test point	Frequency / level
384Fs_in	F911	16.9344 MHz / 3V3
SACD_CLK	F903	16.9344 MHz / 5V
27M_CLK	F503	27MHz / 5V
PCMCLK_AV	F640	12.288MHz / 3V3
MACE CLOCK	F211	8.46 MHz / 3V3



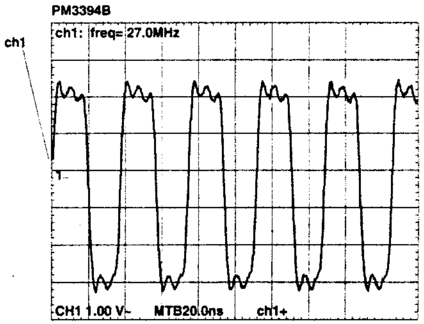
384FS_IN

CL 06532152_016.eps
051200



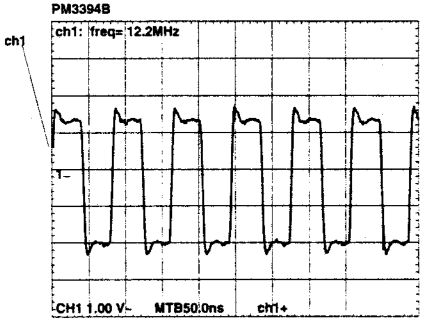
SACD CLK

CL 06532152_017.eps
051200



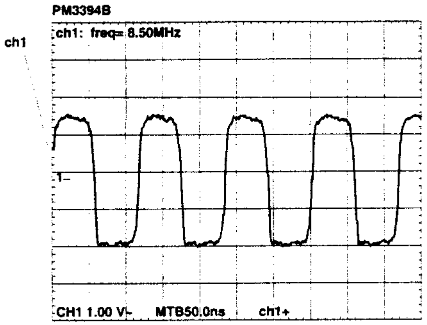
27M_CLK

CL 06532152_018.eps
051200



PCM CLK_AV

CL 06532152_019.eps
051200



MACE CLK

CL 06532152_020.eps
051200

5.5.5 Tests with diagnostic software program

The SACD diagnostic program is included in the SACD application software. This program permits to test a lot of functions of the PCB. We group in this part the memory tests, the general serial bus tests and the peripheral tests of the mono board.

Start up

Conditions
The units required are the SACD power supply, the mono board and the DAC board. This is the minimum set up for the diagnostic program, when testing memories and peripherals. When using the Compair serial cable, pin 1602-2 is directly connected to GND and after powering on, the diagnostic program will be started.
The other end of the service cable is connected to a PC serial port. On the PC you need to open an HyperTerminal and configure it as follows: 19200 b/s, 8 bits data, no parity, 1 stop bit, no control flow.

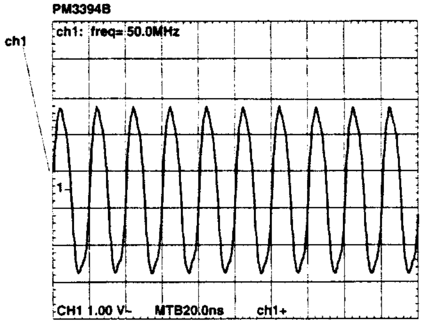
Start the diagnostic
When you switch on, the diagnostic checks the serial port in both directions, followed by few other commands. Those are done automatically during power up. The following message is displayed on the HyperTerminal: "SACD1000 Diagnostic Software version ...". Then the program is waiting that you select a mode. Getting this screen means the Sti5505 can boot from flash. The program is running and the service interface is functioning. Enter the mode you wish to use. You can use either the Menu mode or the Command mode. In the first mode, the main menu appears, you can navigate into the menu system and you can select the individual command, just type the corresponding number to launch it. In the second mode, just type the Ref.# number to do the test. When a Ref.# command is available in the diagnostic program, it will be explained as follow :

Ref.#	Command Name	Remark

At the end of the test, the diagnostic program will return "OK" if the test is passed. Otherwise an error message will appear.

System clock
ST_CLK is the system clock and is derived from the 27 MHz by the internal PLL of the Sti5505 (pin137).

Name	Test point	Frequency	Level
ST_CLK	F822	49.95 MHz	TTL



ST_CLK

CL 06532152_021.eps
051200

Memories

Flashes
Read flash test:
If you can start the diagnostic that means you are able to read the flashes and the program is running. Then you can normally use the diagnostic program. At this moment you can launch the checksum calculation from the diagnostic program.

Ref.#	Command Name	Remark
100	Checksum FLASH	

If you don't encounter any problem during utilisation of the diagnostic program means the Sti5505 is properly connected to the flashes.

SDRAM
Use the diagnostic program for a complete software test of the SDRAM.

Ref.#	Command Name	Remark
104	SDRAM Write Read	Extensive test

I2C bus test

EEprom
To access the EEPROM, the I2C bus is used. So writing and reading back to the EEPROM check the chip and the bus.

Ref.#	Command Name	Remark
123	NVRAM I2C	Quick test - Write and read back

The complete EEPROM can also be checked but it takes a lot of time to write and read back at all the locations.

Ref.#	Command Name	Remark
122	NVRAM write read	Extensive test - Write and read-back

Display board
The mono board accesses to the display board through the I2C bus. You can test this serial bus up to the connector 1501. So connect the display board to the mono board and launch either the following command :

Ref.#	Command Name	Remark
500	Echo	Write and read back
501	version	Software version of the slave processor rom

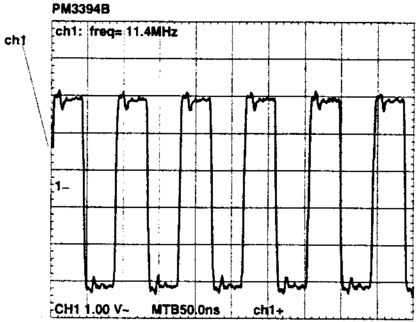
S2B bus
The S2B is the interface between the digital part and the front end. This bus links the STi5505 and the MACE2. The S2B echo command permits to check the communication between those devices.

Ref.#	Command Name	Remark
601	S2b Echo	Write and read back

Peripherals

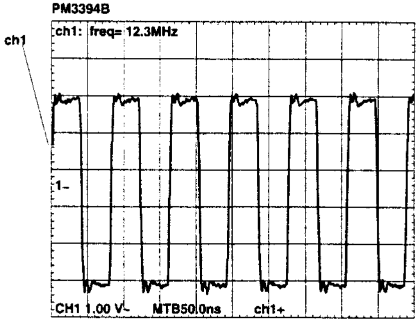
Audio clock select
This clock is derived from the SACD CLOCK by the mono board system clocks. The audio PCM_CLK can take 3 values. The Sti5505 PIO's permit to select 3 different frequencies depending on the application. Check those frequencies on F566

Ref.#	Command Name	Frequency	SEL_ACLK2	SEL_ACLK1
1400	Clock 11.289 MHz	11.2896 MHz	0	1
1401	Clock 12.288 MHz	12.288 MHz	1	0
1402	Clock 24.576 MHz	24.576 MHz	1	1



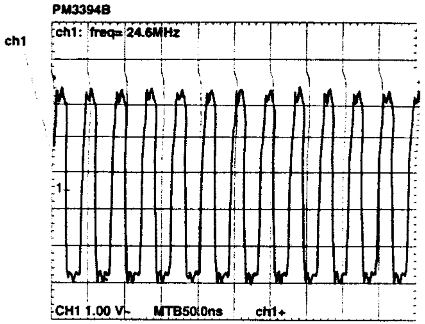
PCM clk 11.298MHz

CL 06532152_022.eps
051200



PCM clk 12.288MHz

CL 06532152_023.eps
051200



PCM clk 24.576MHz

CL 06532152_024.eps
051200

Audio mute

Ref.#	Command Name	MUTE_AV at F625	Remark
109	Mute ON	+4.8V	Audio Mute On
110	Mute OFF	-8V	Audio Mute Off

Center on/Mono
Check whether we can switch between the mono mode and the stereo mode. Measure the level on F633.

Ref.#	Command Name	Center on	Remark
113	Centre-On-Stereo Pin On	3.3V	Mono
114	Centre-On-Stereo Pin Off	0V	Stereo

I2C DAC
Check whether you can enable or disable the I2C switch. When driving the I2C_DAC signal measure the corresponding level at F001.

Ref.#	Command Name	level
1301	I2C enable	H = 5V
1302	I2C disable	L = 0V

Slow blanking
An additional part of the video-path is the scart-switching or slow blanking voltage.
This voltage can be 0V, 6V. Check at F620 the output voltage with next commands:

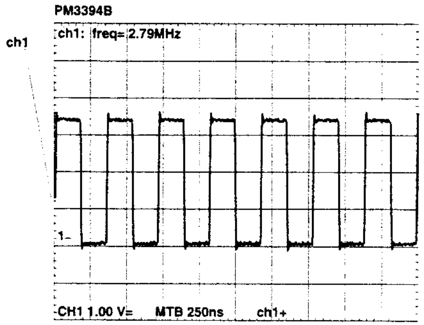
Ref.#	Command Name	Remark	Level
1410	Scart Low	No picture	0V ± 0.5V
1411	Scart Medium	16/9 format	6V ± 10%

PCM Audio on I2S bus
For this test connect the A/V board and the front panel to the monoboard. Don't forget to power up the front panel. The I2S audio signals are measured in 3 different situations: no audio, sine wave is played, pink noise is played.

No audio
Switch ON the power supplies and check these signals

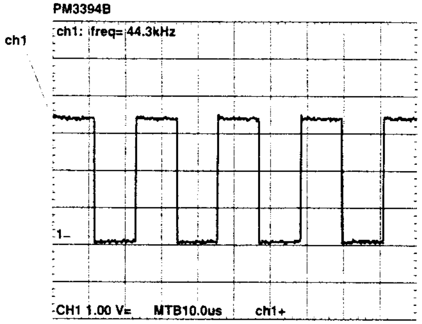
Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	2.82MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	44.1KHz < 0.02%
PCM_CLK_AV	F640	No signal	LVTTL	N/A
PCMOUT_AV	F638	No signal	LVTTL	N/A

Signal	Test point	type	Level	Frequency
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A



SCLK_AV

CL 06532152_025.eps
051200



LRCLK_AV

CL 06532152_026.eps
051200

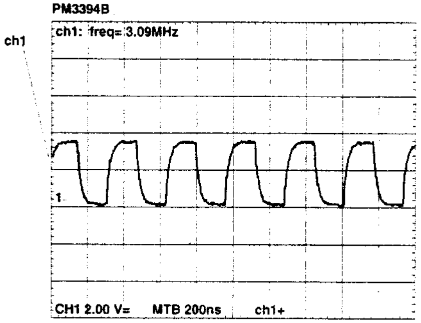
Sine wave
Generate the sine wave with the following command

Ref.#	Command Name	Remark
117	Sine ON	Play the sine wave at the audio outputs

Then measure the following signals

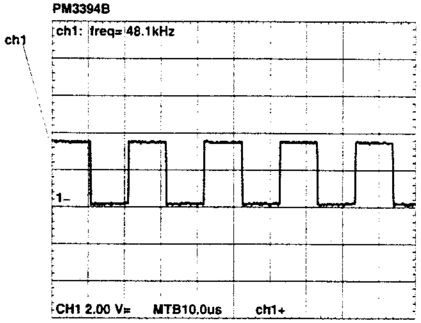
Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCMCLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	No signal	LVTTL	N/A
PCM_LsRs_Fur	F504	No signal	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

Press "STOP" to switch off the sine wave.



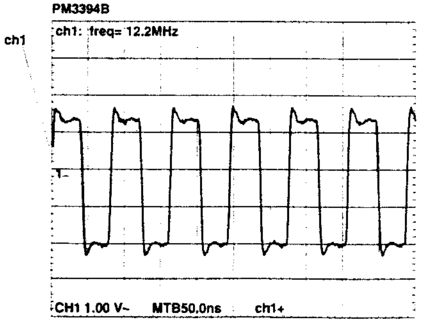
SCLK_AV 3.072MHz

CL 06532152_027.eps
051200



LRCLK_AV 48kHz

CL 06532152_028.eps
051200



PCM CLK_AV

CL 06532152_029.eps
051200

Pink noise
Generate the pink noise with the following command

Ref.#	Command Name	Remark
115	Pink Noise ON	Play the pink noise at the audio outputs

Then measure the following signals

Signal	Test point	type	Level	Frequency
SCLK_AV	F637	Clock	LVTTL	3.072MHz < 0.02%
LRCLK_AV	F641	Clock	LVTTL	48 kHz < 0.02%
PCM_CLK_AV	F640	Clock	LVTTL	12.288 MHz < 0.02%
PCMOUT_AV	F638	Data stream	LVTTL	N/A
PCM_Ce_Lf_Fur	F659	Data stream	LVTTL	N/A
PCM_LsRs_Fur	F504	Data stream	LVTTL	N/A
SPDIF	F644	Data stream	TTL	N/A

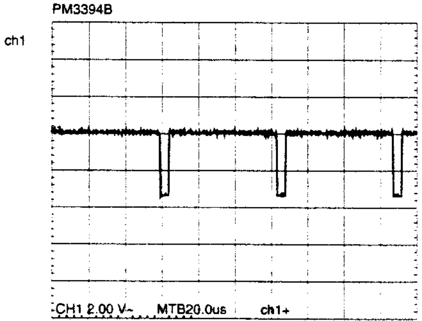
5.5.6 Video

From the diagnostic program, play the 8 colour bar pattern.

Ref.#	Command Name	Remark
120	Colour bar On	8-color bar pattern
121	Colour bar Off	Disable the pattern

Video Hsync
Measure this output at F656

Ref.#	Command Name	Remark	Value
120	Colour bar On		15.625 kHz ± 0.02% Vpeak-peak > 3V

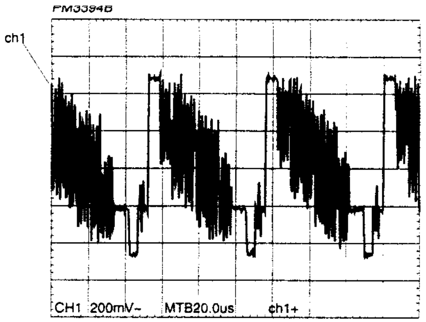


HSYNC

CL 06532152_030.eps
051200

Video signals

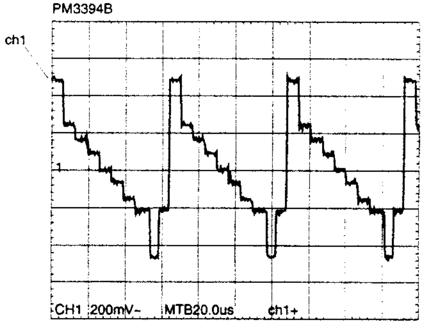
CVBS
Measured at F657



CVBS

CL 06532152_031.eps
051200

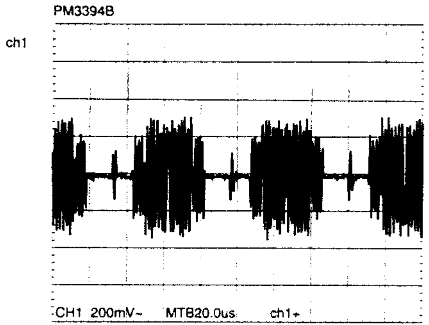
Luminance Y-VID
Measured at F662



Y_VID

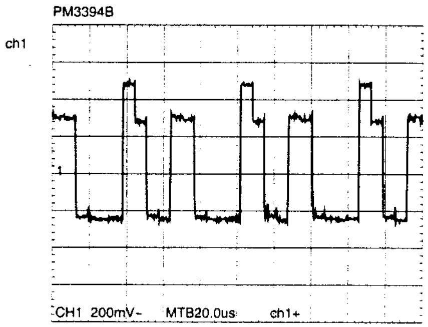
CL 06532152_032.eps
051200

Chrominance C_VID
Measured at F665



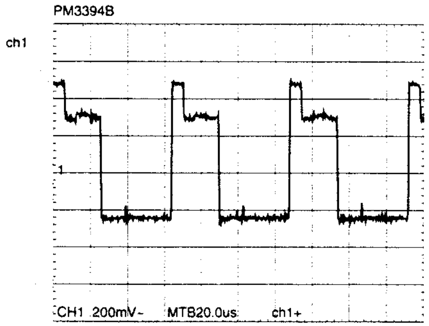
C_VID
CL 06532152_033.eps
051200

Red R_VID
Measured at F646



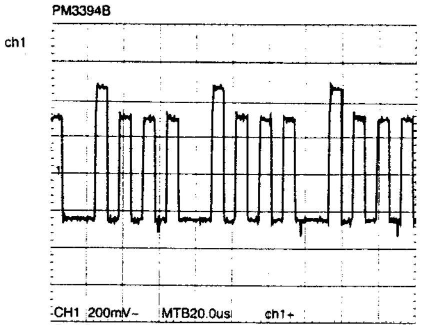
R_VID
CL 06532152_034.eps
051200

Green G_VID
Measured at F649



G_VID
CL 06532152_035.eps
051200

Blue B_VID
Measured at F653



B_VID
CL 06532152_036.eps
051200

Switch off the colour bar with the following command:

Ref.#	Command Name	Remark	Value
121	Colour bar Off		Disable the pattern

SACD Processor/Furore

With the following commands, the access of the Furore and its SDRAM is checked.

Ref.#	Command Name	Remark
1204	DS_FURORE_Id	Check Furore ID
1200	DS_FURORE_Sdram WrRLow	Check full speed SDRAM
1201	DS_FURORE_Sdram WrRHigh	Check full speed SDRAM
1202	DS_FURORE_Sdram WrRLowFast	Check full speed SDRAM
1203	DS_FURORE_Sdram WrRHighFast	Check full speed SDRAM

RF signal amplitude

This signal is measured at F851 just at the input of the Furore. When no disc is in the player, we measured 54 mV. Then a disc is inserted and played, at this moment the RF signal increases. We measured 1.05 V amplitude and the level of this input should be between 0.2V and 1.5 V. Then we can play normally a SACD disc.

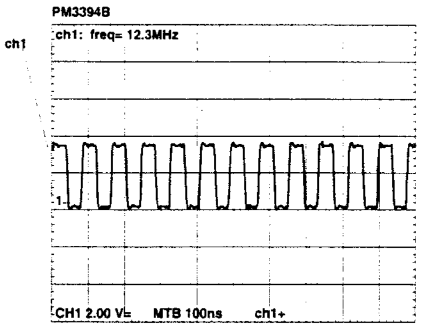
DSD outputs

With the diagnostic software, we can partially test the DSD_PCM bus toward the DAC board. When you play a pink noise, digital bit stream is coming out of the Furore and is fed to the DAC board.

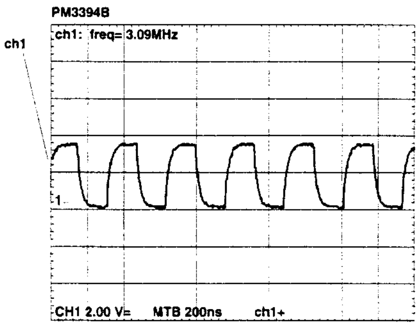
Ref.#	Command Name	Remark
115	Pink Noise ON	Play the pink noise at the audio outputs

Measure the following signals

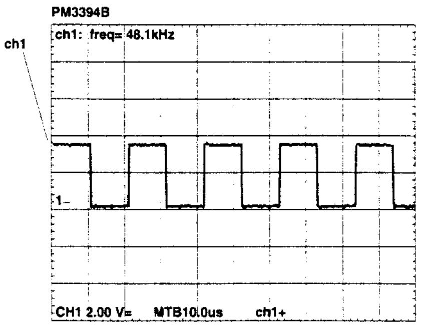
Signal	Test point	type	Level	Frequency
DSD_PCM(8)	F002	Clock	LVTTL	12.288 MHz < 0.02%
DSD_PCM(6)	F003	Clock	LVTTL	3.072 MHz < 0.02%
DSD_PCM(7)	F004	Clock	LVTTL	48 kHz < 0.02%
DSD_PCM(0)	F005	Data stream	LVTTL	N/A
DSD_PCM(1)	F006	Signal : High	LVTTL	N/A
DSD_PCM(4)	F007	Data stream	LVTTL	N/A
DSD_PCM(5)	F008	Signal : High	LVTTL	N/A
DSD_PCM(2)	F009	Data stream	LVTTL	N/A
DSD_PCM(3)	F010	Signal : High	LVTTL	N/A



DSD_PCM8
CL 06532152_037.eps
051200



DSD_PCM6
CL 06532152_038.eps
051200



DSD_PCM7
CL 06532152_039.eps
051200

5.5.7 SERVO TESTS

General start-up measurements:

Reset the Basic Engine part

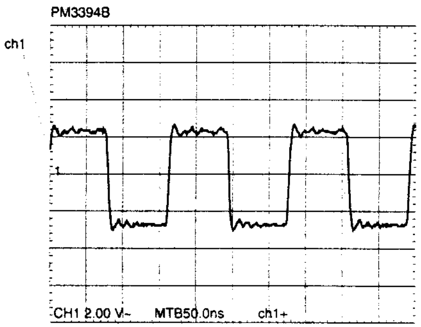
Ref. #	Command Name	Remark
603	BeReset	Reset Basic Engine

Check Vref

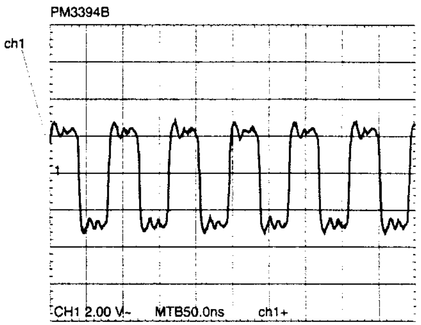
Name	Testpoint	Value
Vref	F188	2.5V+/-0.3

Check I2S interface

Name	Testpoint	Value
B_BCLK	F347	6.0MHz +/-0.1
CL1	F337	12.0MHz +/-0.2
B_WCLK	F343	HIGH
Stopclk	F338	HIGH
B_Sync	F344	HIGH
B_V4	F348	HIGH



B_BCLK
CL 06532152_040.eps
051200



CL1
CL 06532152_041.eps
051200

Disc Motor:

Before switching on the disc motor, check the following test points:

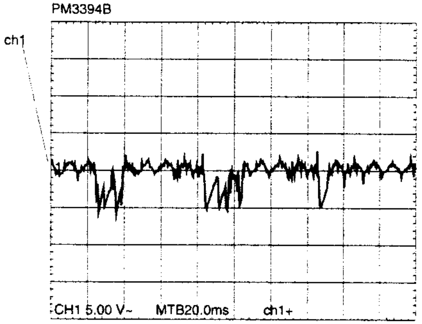
Name	Testpoint	Value
Stby	F357	high
Stby-out	F355	LOW
Moto1	F361	3V±0.3

Switch the Discmotor on/off with next commands:

Ref. #	Command Name	Remark
606	BeDiscmotorOn	Discmotor on
607	BeDiscmotorOff	Discmotor off

Check the following signals when discmotor has been switched on:

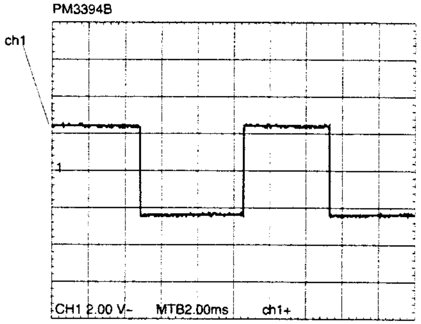
Name	Pin nr.	Frequency
Stby	F357	low
Stby-out	F355	HIGH
Moto1	F361	2V±0.5V
A3	F350	see oscillo-gram
A2	F352	see oscillo-gram
A1	F353	see oscillo-gram



A1-A2-A3

CL 06532152_042.eps
051200

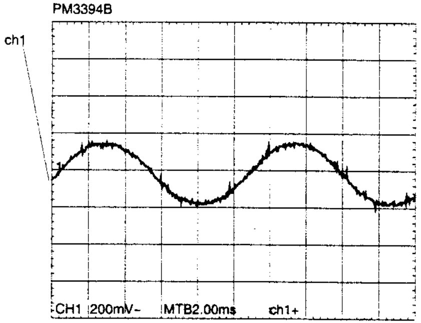
T1	F280	see oscillogram
T2	No testpoint present	see oscillogram
T3	F371	see oscillogram



T1-T2-T3

CL 06532152_043.eps
051200

VH	F365	3V±0.5V
H1+	F354	see oscillogram
H1-	F359	see oscillogram
H2+	F364	see oscillogram
H2-	F366	see oscillogram
H3+	F367	see oscillogram
H3-	F370	see oscillogram



H1-H2-H3

CL 06532152_044.eps
051200

Switch the discmotor off.

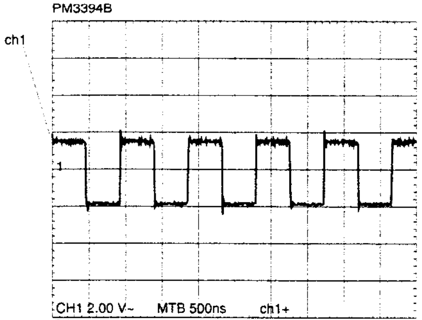
Radial

Swith the radial control on/off with the following commands:

Ref. #	Command Name	Remark
608	BeRadialOn	Radial control on
609	BeRadialOff	Radial control off

Check the following signals:
Check for pulse density signal RA at testpoint F227

Name	Testpoint	Value
Rad -	F128	4.3V±0.5V
Rad +	F121	4.3V±0.5V



RA

CL 06532152_045.eps
051200

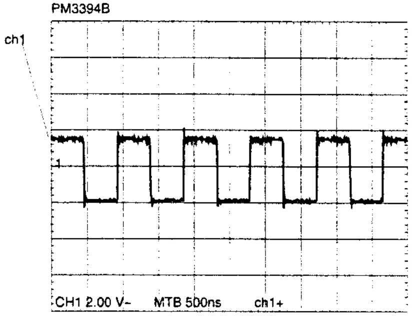
Check if laser is switched on (visual check of laserlight).
Switch the radial control off.

Sledge

Use the following commands to move the sledge:

Ref. #	Command Name	Remark
610	BeSledgeIn	Sledge inwards
611	BeSledgeOut	Sledge outwards

Check pulse density signal SL at testpoint F221



SL

CL 06532152_046.eps
051200

Name	Testpoint	Value
Sl -	F039	4.5V±0.5V
Sl +	F038	4.5V±0.5V

Measure peak to peak signal on SL- and SL+ while moving sledge outwards.

Name	Testpoint	Value
Sl -	F039	10Vptp +/-0.5
Sl +	F038	10Vptp +/-0.5

Measure input sledge control (sledge in home position)

Name	Testpoint	Value
Sinph	F182	1.5V±0.5V
Cosph	F192	1.5V±0.5V

Tray:

To open and close the tray use the following commands:

Ref. #	Command Name	Remark
615	BeTrayIn	Tray in
616	BeTrayOut	Tray out

Measure the driver outputs of the BA5938FM for the tray closed.

Name	Testpoint	Value
Vo2 -	F116	4.3V±2.0V
Vo2 +	F111	4.3V±2.0V

Measure again the driver outputs while the tray is opening.

Name	Testpoint	Value
Vo2 -	F116	6.0V±1.0V
Vo2 +	F111	2.0V±1.0V

Measure again the driver outputs while the tray is closing

Name	Testpoint	Value
Vo2 -	F116	2.0V±1.0V
Vo2 +	F111	6.0V±1.0V

Focus

To switch the Focus motor on/off, use the following commands:

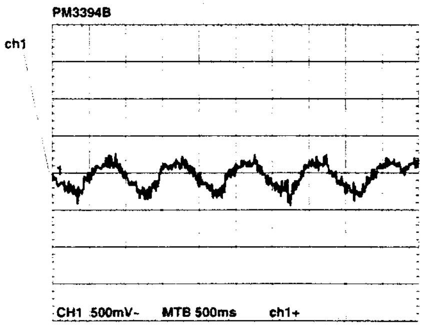
Ref. #	Command Name	Remark
604	BeFocusOn	Focus on
605	BefocusOff	Focus off

Measure the driver outputs of the BA5938FM for the Focus off.

Name	Testpoint	Value
foc -	F124	4.3V±0.5V
foc +	F127	4.3V±0.5V

Switch the focus on
Measure again the driver outputs

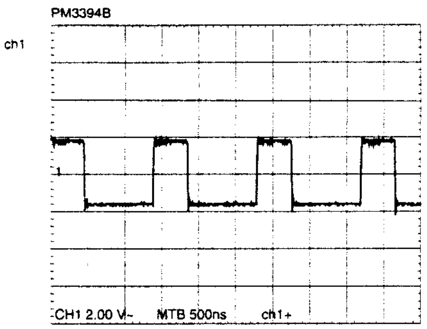
Name	Testpoint	Value
Foc - (sawtooth)	F124	1V±0.2V
Foc + (sawtooth)	F127	1V±0.2V



FOC +

CL 06532152_047.eps
051200

Check for pulse density signal FO at testpoint F234



CL 06532152_048.eps
051200

Check for laserlight.
Switch the focus off

Hf path
Play DVD test disc.
Measure outputs of diodes A, B, C, D, E, F.

Name	Testpoint	Value
A	F140	2.6V±0.2V
B	F141	2.6V±0.2V
C	F143	2.6V±0.2V
D	F144	2.6V±0.2V
E	F147	2.6V±0.2V
F	F148	2.6V±0.2V

Measure DVDALAS outputs

Name	Testpoint	Value
RFO DC	F146	2.5V ± 0.2V, eyepattern 1Vptp
O1	F155	25mV±10mV
O2	F158	25mV±10mV
O3	F168	25mV±10mV
O4	F165	25mV±10mV
S1	F174	25mV±10mV
S2	F175	25mV±10Mv

5.6 Test instructions Display board

5.6.1 Display board

Introduction
These test instructions are written for all versions of the display PCB 3104 123 42230.
The contents of the PCB can be split up into next blocks:

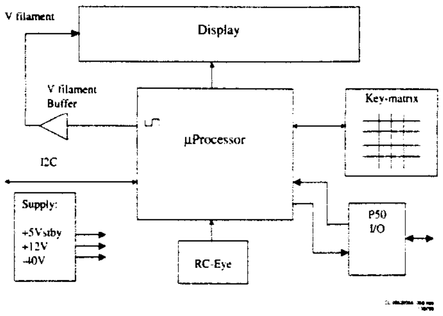


Figure 5-10

Functionality description:
The essential component of the display PCB is the uP (slave). This slave works on an 8MHz resonator and has a reset circuit that is triggered by the +5Vstby. After the reset pulse, the standby control line will release the reset of the host uP. This host uP will then initialise the slave. In addition, when going to stand-by, the slave will put the host uP in reset. When the slave receives the right IR or key code to leave the standby mode, the reset of the host uP will be released.
Other slave functions are:

- Square signal generator to generate the filament voltage, which is required for an AC FTD.
- Generates the grid and segment scanning for the FTD.
- Generates a scanning grid for the keys (separated from display scanning).
- Has inputs for RC (RC5 and RC6) and P50 (P50 controller is built in).

General

- Oscilloscope measurements have been carried out using a Philips PM3392A.
- Impedance of measuring-equipment should be > 1MΩ.
- To do correct measurements we recommend to use supply 3122 427 21370, which is used in all "second generation B" DVD-players. Make sure that the main 3.3V has a 0.7A load.

Reset
Check next reset timing with an oscilloscope at pin 10 of the (processor.

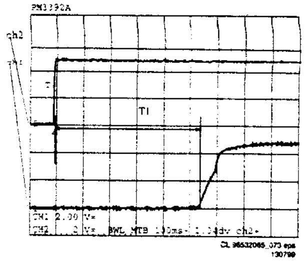


Figure 5-11

Timing: 400msec < T1 > 700msec.
CH1: +5Vstby voltage at power on.
CH2: Voltage at pin 10.

Display steering
Check next timing and level for all grid-lines (G1 r G14).

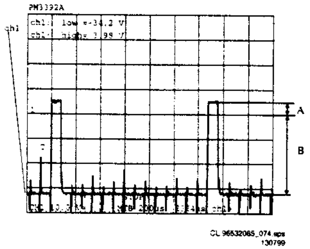


Figure 5-12

1. Check level A: +4V5 ±10% for grid lines 1 => 11
2. Check level A: +4V0 ±10% for grid lines 12 => 14
3. Check level B: -33V ±10%
4. Check timing and levels of segment-lines P1 r P10:

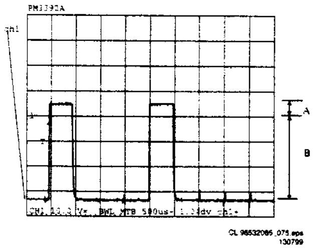


Figure 5-13

Level A:+4V5 ±10%
Level B:-33V ±10%
The data on these segment lines depend on the characters that are displayed.
The characters can be set by sending I2C commands to the display.
See the Slave URS how to send a display command.

Key-matrix
Connect a extra 10k(pull-up to pin 36 en 37 of the uP and check next matrix scanning at these pins.

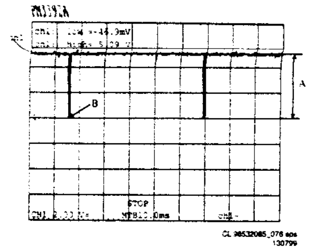


Figure 5-14

Level A: 5.0V ±7%
Level B: 0V ±200mV
Check matrix scanning from pin 26 until 33 of the uP.
The results should be the same as the diagram above.

I.R. receiver
Check at pin 23 of the (P if this line switches from low (< 0.3V to high (> 4.5V), while pressing a key on a Philips RC5 or RC6 remote control.

P50 interface
P50 is a bi-directional serial interface, which is used for communication between video equipment. For European sets, this communication goes via pin 10 of the scart-bus. In other regions, it can be a cinch bus at the back of the set.

1. Keep the uP in reset by short-circuiting emitter and collector of transistor 7108, via resistor 3100 and 3104 transistor 7101 is switched on.
2. Check the voltage at the P50 output connector 1118-5: < 200mV.

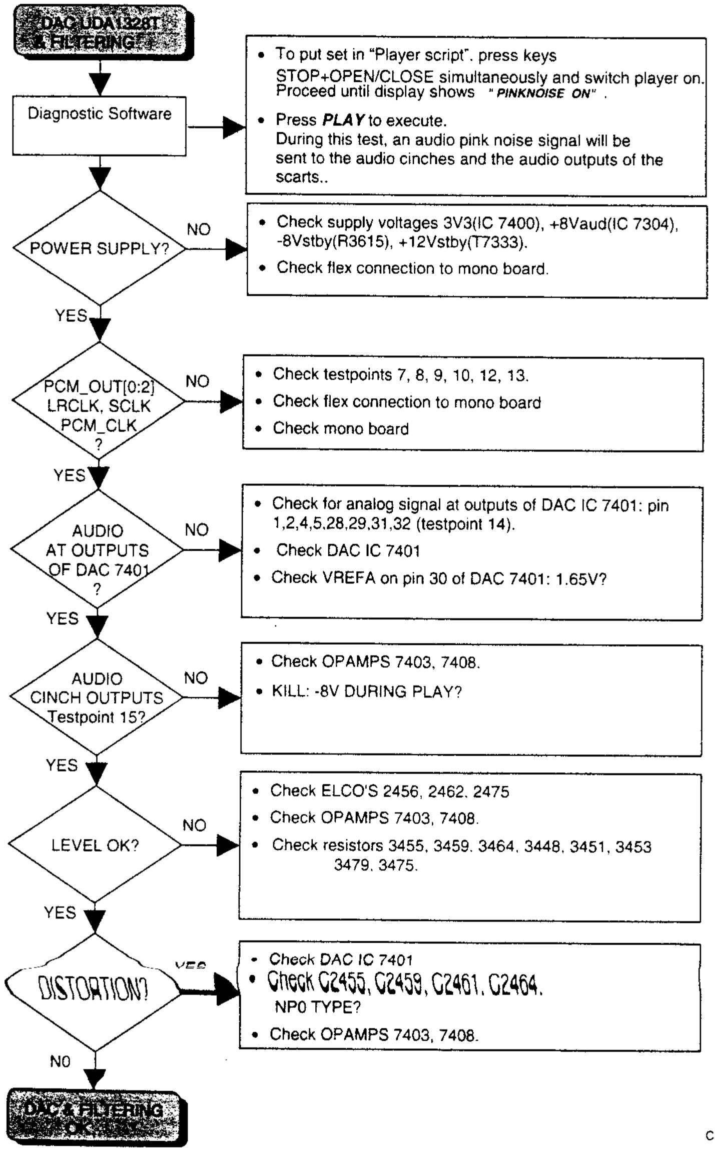
When the reset is released the uP output-pin becomes low and transistor 7101 is switched off.

1. Check the voltage at the P50 output connector 1118-5: 4V9 ±5%.
2. Check also the uP P50 input (uP pin 20): 5V ±5%.
3. Connect the P50 line (connector 1118-5) to ground.
4. Check again the uP P50 input (uP pin 20): <0V3.

5.7 *Trouble shooting AV Board*

Testing of A/V board can be done using diagnostic software “Player script”.
Mono board is used to generate a sound with the sound tests PINKNOISE ON and SINE ON.
A VIDEO signal is generated with COLOUR-B ON.
Functional control of scart switching is also possible.

AUDIO PART


DAC UDA1328T & FILTERING?
Diagnostic Software
POWER SUPPLY?
NO
YES
PCM_OUT[0:2] LRCLK, SCLK PCM_CLK ?
NO
YES
AUDIO AT OUTPUTS OF DAC 7401 ?
NO
YES
AUDIO CINCH OUTPUTS Testpoint 15?
NO
YES
LEVEL OK?
NO
YES
DISTORTION?
YES
NO
DAC & FILTERING OK

- To put set in “Player script”. press keys STOP+OPEN/CLOSE simultaneously and switch player on. Proceed until display shows *“ PINKNOISE ON”* .
- Press ***PLAY*** to execute. During this test, an audio pink noise signal will be sent to the audio cinches and the audio outputs of the scarts..

- Check supply voltages 3V3(IC 7400), +8Vaud(IC 7304), -8Vstby(R3615), +12Vstby(T7333).
- Check flex connection to mono board.

- Check testpoints 7, 8, 9, 10, 12, 13.
- Check flex connection to mono board
- Check mono board

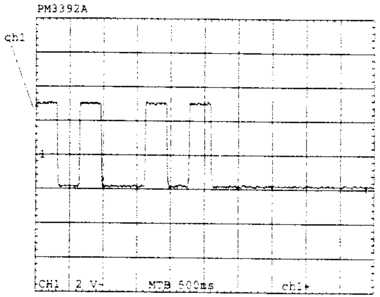
- Check for analog signal at outputs of DAC IC 7401: pin 1,2,4,5,28,29,31,32 (testpoint 14).
- Check DAC IC 7401
- Check VREFA on pin 30 of DAC 7401: 1.65V?

- Check OPAMPS 7403, 7408.
- KILL: -8V DURING PLAY?

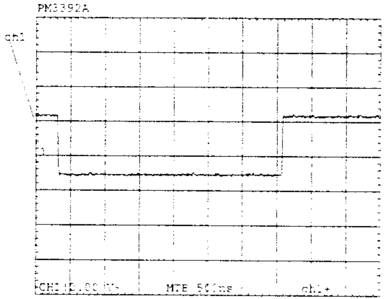
- Check ELCO'S 2456, 2462, 2475
- Check OPAMPS 7403, 7408.
- Check resistors 3455, 3459, 3464, 3448, 3451, 3453 3479, 3475.

- Check DAC IC 7401
- Check C2455, C2459, C2461, C2464. NP0 TYPE?
- Check OPAMPS 7403, 7408.

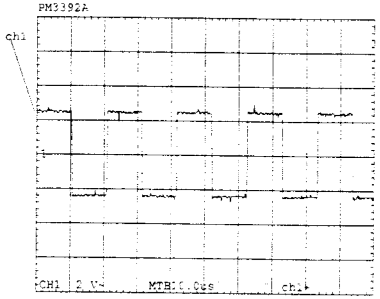
CL 06532152_090.eps
131200



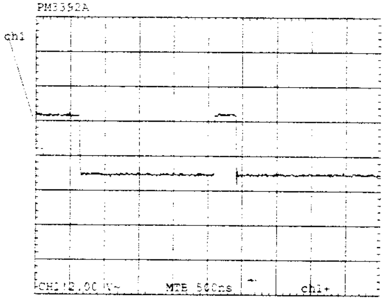
TP 7: PCM_OUT0



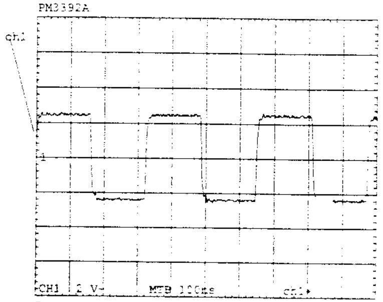
TP12: PCM_OUT2



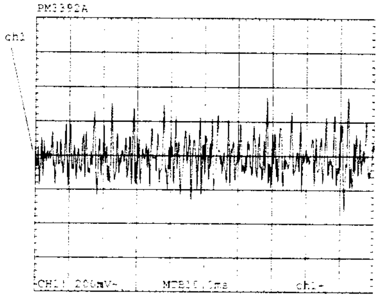
TP8: LRCLK



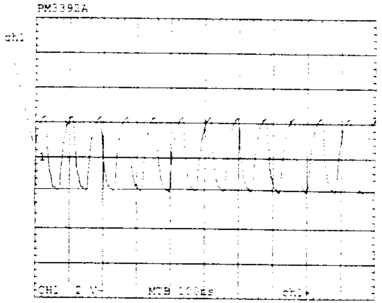
TP13: PCM_OUT1



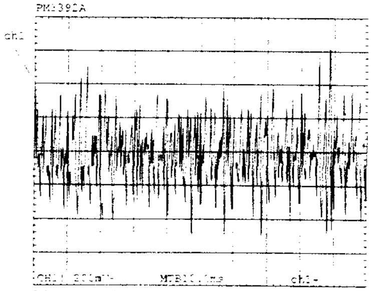
TP9: SCLK



TP14: ANALOG OUT DAC (PINK NOISE)



TP10: PCM_CLK



TP15: ANALOG OUT AUDIO CINCH(PINK NOISE)

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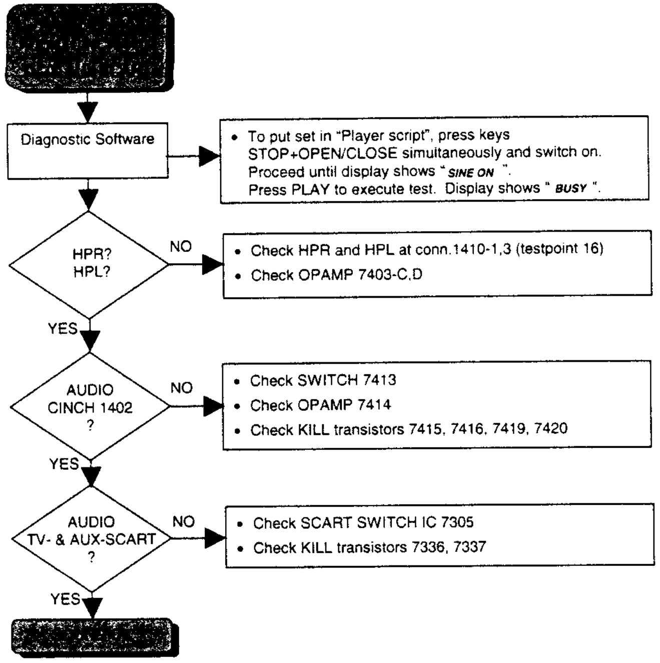
131200

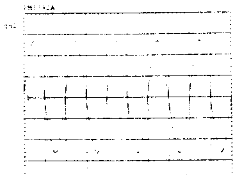

Diagnostic Software
HPR?
HPL?
NO
YES
AUDIO
CINCH 1402
?
NO
YES
AUDIO
TV- & AUX-SCART
?
NO
YES

- To put set in “Player script”, press keys STOP+OPEN/CLOSE simultaneously and switch on. Proceed until display shows “ *SINE ON* ”. Press PLAY to execute test. Display shows “ *BUSY* ”.

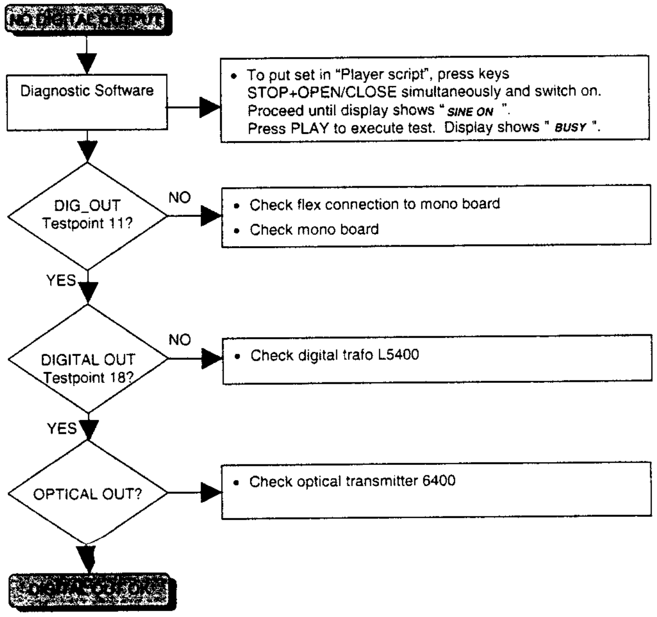
- Check HPR and HPL at conn.1410-1,3 (testpoint 16)
- Check OPAMP 7403-C,D

- Check SWITCH 7413
- Check OPAMP 7414
- Check KILL transistors 7415, 7416, 7419, 7420

- Check SCART SWITCH IC 7305
- Check KILL transistors 7336, 7337



TP 16: ANALOG OUTPUT AUDIO HP_R & HP_L

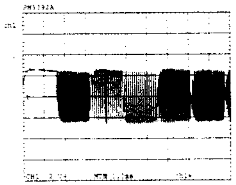

NO DIGITAL OUTPUT
Diagnostic Software
DIG_OUT
Testpoint 11?
NO
YES
DIGITAL OUT
Testpoint 18?
NO
YES
OPTICAL OUT?
DIGITAL OUT OK

- To put set in “Player script”, press keys STOP+OPEN/CLOSE simultaneously and switch on. Proceed until display shows “ *SINE ON* ”. Press PLAY to execute test. Display shows “ *BUSY* ”.

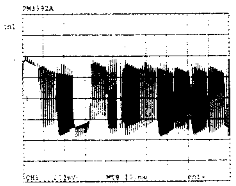
- Check flex connection to mono board
- Check mono board

- Check digital trafo L5400

- Check optical transmitter 6400



TP 11: DIG_OUT



TP 18: DIGITAL OUT

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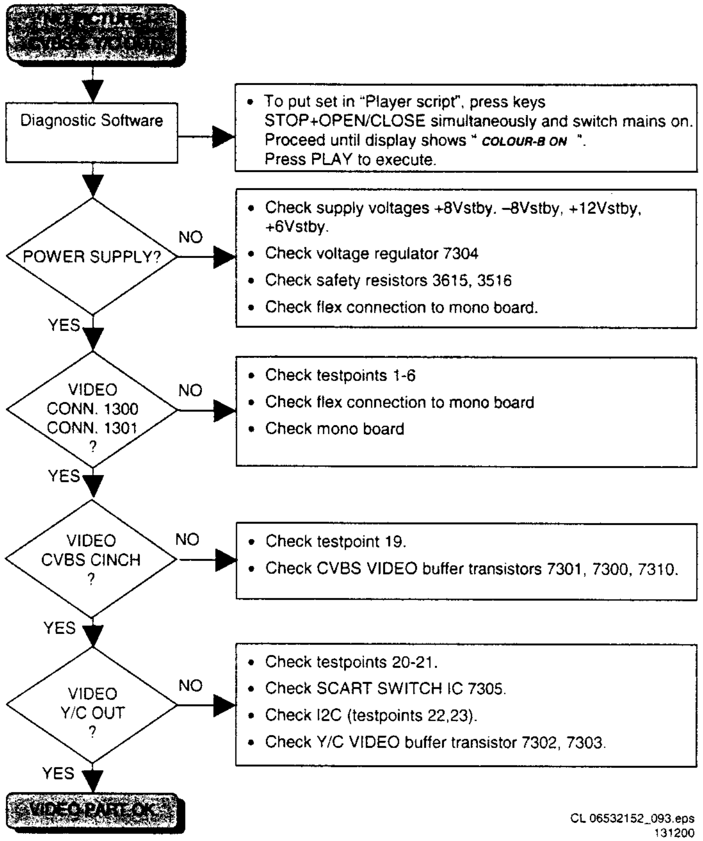
131200

VIDEO PART


NO PICTURE
CVBS Y/C OUT
Diagnostic Software
POWER SUPPLY?
NO
YES
VIDEO
CONN. 1300
CONN. 1301
?
NO
YES
VIDEO
CVBS CINCH
?
NO
YES
VIDEO
Y/C OUT
?
NO
YES
VIDEO PART OK

- To put set in “Player script”, press keys STOP+OPEN/CLOSE simultaneously and switch mains on. Proceed until display shows “ *COLOUR-8 ON* ”. Press PLAY to execute.

- Check supply voltages +8Vstby. –8Vstby, +12Vstby, +6Vstby.
- Check voltage regulator 7304
- Check safety resistors 3615, 3516
- Check flex connection to mono board.

- Check testpoints 1-6
- Check flex connection to mono board
- Check mono board

- Check testpoint 19.
- Check CVBS VIDEO buffer transistors 7301, 7300, 7310.

- Check testpoints 20-21.
- Check SCART SWITCH IC 7305.
- Check I2C (testpoints 22,23).
- Check Y/C VIDEO buffer transistor 7302, 7303.

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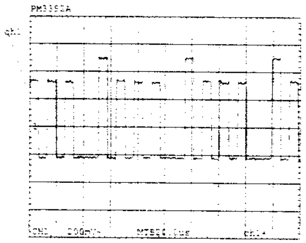
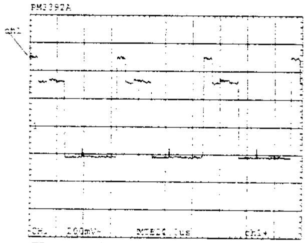
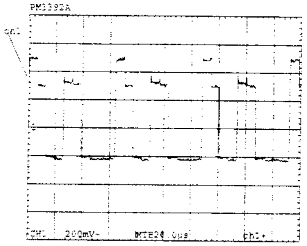
131200



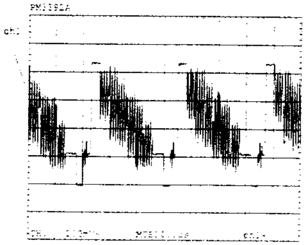
TP 1 : video B



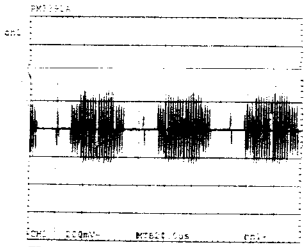
TP 2 : video G



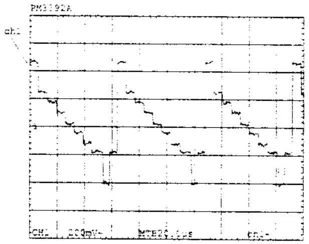
TP 3 : video R



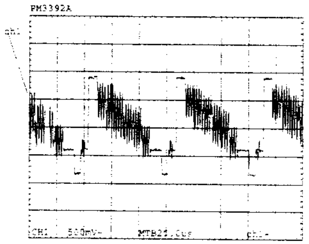
TP 4 : CVBS



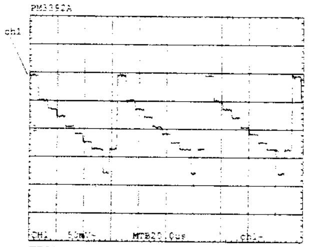
TP 5 : C_ENC



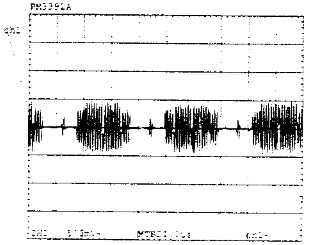
TP 6 : Y_ENC



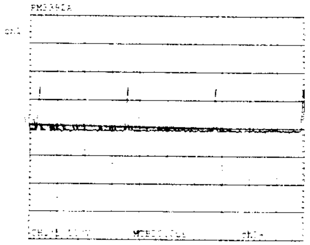
TP 19 : CVBS_OUT



TP20: Y_OUT



TP 21: C_OUT



TP24: HSYNC

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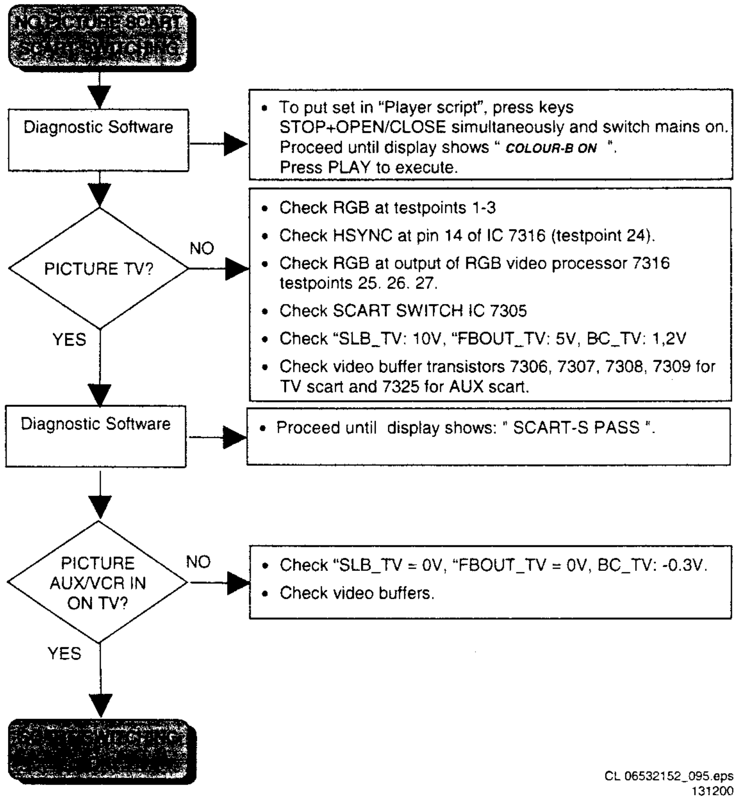
131200


NO PICTURE SCART
SCART SWITCHING
Diagnostic Software
PICTURE TV?
NO
YES
Diagnostic Software
PICTURE AUX/VCR IN ON TV?
NO
YES
SCART SWITCHING

- To put set in “Player script”, press keys STOP+OPEN/CLOSE simultaneously and switch mains on. Proceed until display shows “ ***COLOUR-B ON*** ”. Press PLAY to execute.

- Check RGB at testpoints 1-3
- Check HSYNC at pin 14 of IC 7316 (testpoint 24).
- Check RGB at output of RGB video processor 7316 testpoints 25. 26. 27.
- Check SCART SWITCH IC 7305
- Check “SLB_TV: 10V, “FBOUT_TV: 5V, BC_TV: 1,2V
- Check video buffer transistors 7306, 7307, 7308, 7309 for TV scart and 7325 for AUX scart.

- Proceed until display shows: " SCART-S PASS ".

- Check “SLB_TV = 0V, “FBOUT_TV = 0V, BC_TV: -0.3V.
- Check video buffers.

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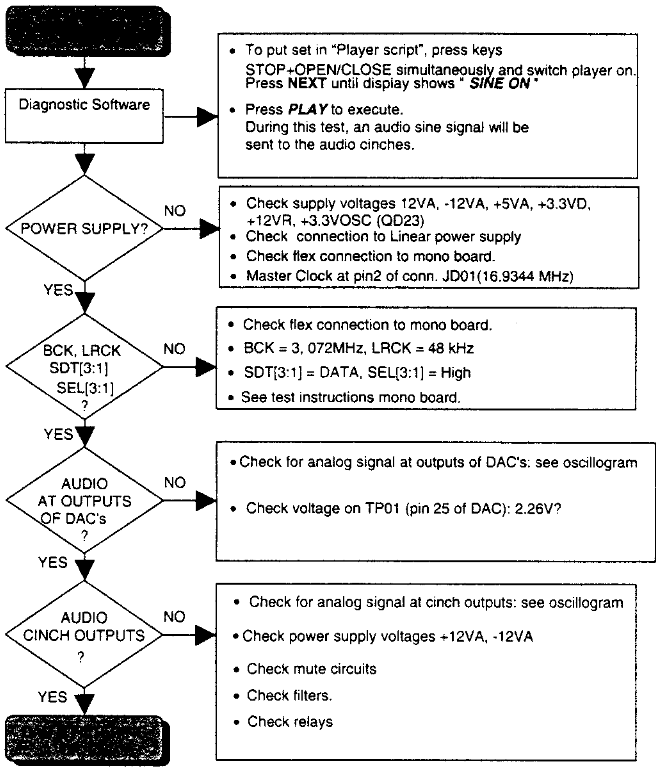
131200

5.8 Trouble shooting DAC Board

TROUBLESHOOTING DAC BOARD

Testing of DAC board can be done using diagnostic software "Player script". Mono board is used to generate a sound with the sound test SINE ON.


Diagnostic Software
POWER SUPPLY?
NO
YES
BCK, LRCK
SDT[3:1]
SEL[3:1]
?
NO
YES
AUDIO
AT OUTPUTS
OF DAC's
?
NO
YES
AUDIO
CINCH OUTPUTS
?
NO
YES

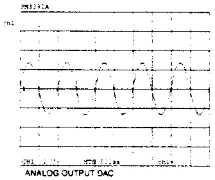
- To put set in "Player script", press keys STOP+OPEN/CLOSE simultaneously and switch player on. Press **NEXT** until display shows "***SINE ON***"
- Press ***PLAY*** to execute. During this test, an audio sine signal will be sent to the audio cinches.

- Check supply voltages 12VA, -12VA, +5VA, +3.3VD, +12VR, +3.3VOSC (QD23)
- Check connection to Linear power supply
- Check flex connection to mono board.
- Master Clock at pin2 of conn. JD01(16.9344 MHz)

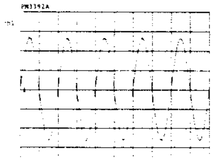
- Check flex connection to mono board.
- BCK = 3, 072MHz, LRCK = 48 kHz
- SDT[3:1] = DATA, SEL[3:1] = High
- See test instructions mono board.

- Check for analog signal at outputs of DAC's: see oscillogram
- Check voltage on TP01 (pin 25 of DAC): 2.26V?

- Check for analog signal at cinch outputs: see oscillogram
- Check power supply voltages +12VA, -12VA
- Check mute circuits
- Check filters.
- Check relays



ANALOG OUTPUT DAC



ANALOG OUTPUT AUDIO CINCH

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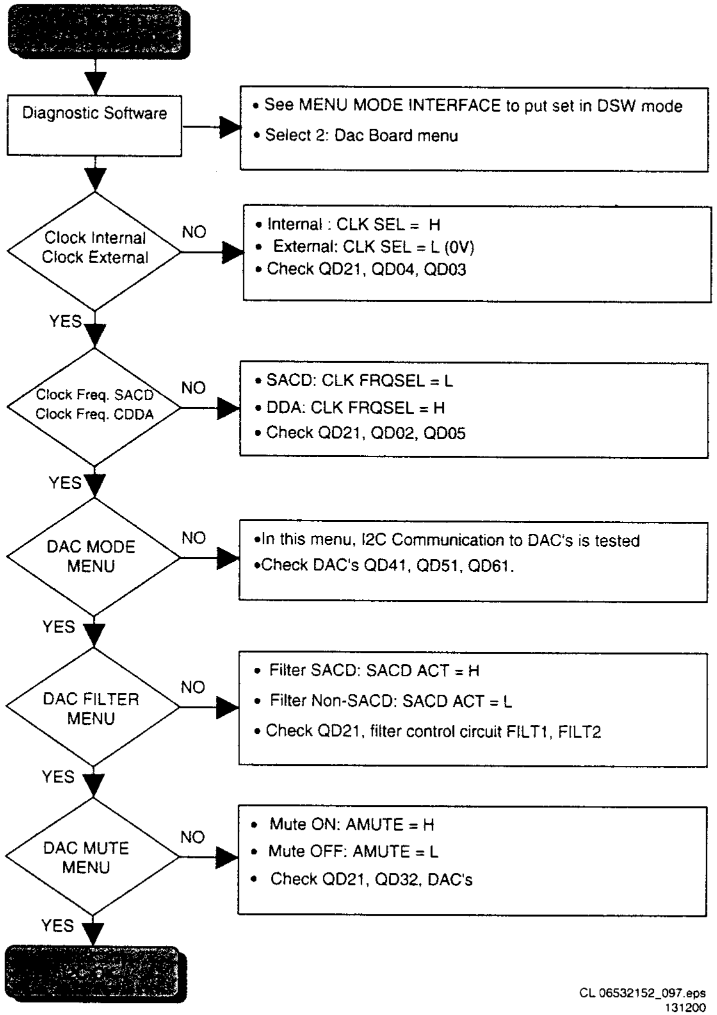
131200

Testing of I2C communication to DAC board can be done using diagnostic software.


Diagnostic Software
Clock Internal
Clock External
NO
YES
Clock Freq. SACD
Clock Freq. CDDA
NO
YES
DAC MODE
MENU
NO
YES
DAC FILTER
MENU
NO
YES
DAC MUTE
MENU
NO
YES

- See MENU MODE INTERFACE to put set in DSW mode
- Select 2: Dac Board menu

- Internal : CLK SEL = H
- External: CLK SEL = L (0V)
- Check QD21, QD04, QD03

- SACD: CLK FRQSEL = L
- DDA: CLK FRQSEL = H
- Check QD21, QD02, QD05

- In this menu, I2C Communication to DAC's is tested
- Check DAC's QD41, QD51, QD61.

- Filter SACD: SACD ACT = H
- Filter Non-SACD: SACD ACT = L
- Check QD21, filter control circuit FILT1, FILT2

- Mute ON: AMUTE = H
- Mute OFF: AMUTE = L
- Check QD21, QD32, DAC's

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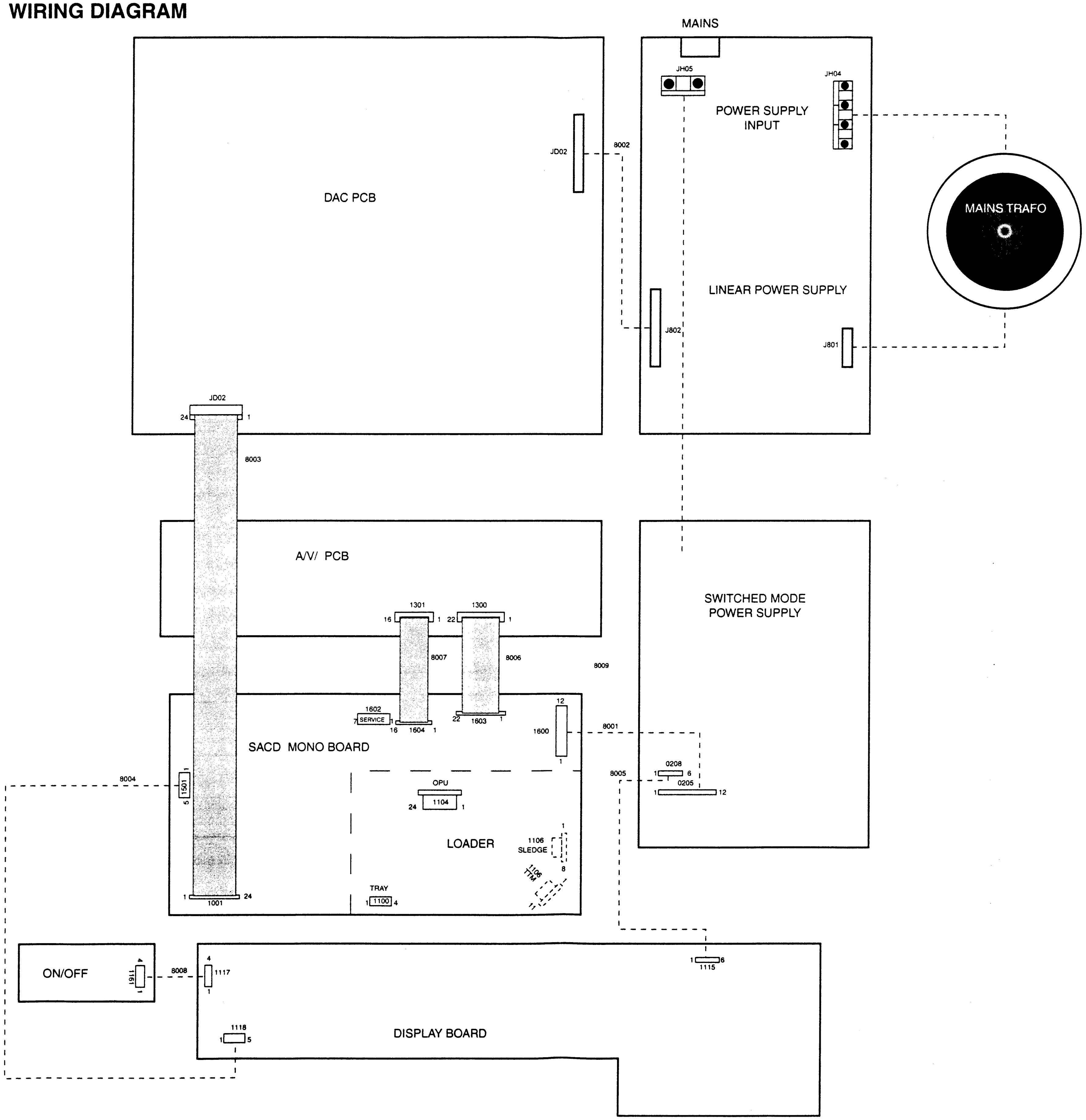
131200

Personal notes:

6. Wiring and block diagram

Wiring diagram

WIRING DIAGRAM


MAINS
JH05
JH04
POWER SUPPLY INPUT
JD02
8002
DAC PCB
MAINS TRAFO
LINEAR POWER SUPPLY
J802
J801
JD02
24
1
8003
A/V/ PCB
1301
16
1
1300
22
1
8007
8006
8009
1602
7
SERVICE
1
16
1604
1
22
1603
1
12
1600
1
8001
SACD MONO BOARD
SWITCHED MODE POWER SUPPLY
8004
1501
1
5
OPU
24
1104
1
0208
1
6
8005
0205
1
12
LOADER
1106
SLEDGE
1
8
1106
TTM
TRAY
1
1100
4
1
1001
24
ON/OFF
1161
4
1
8008
4
1117
1
1
1115
6
1118
1
5
DISPLAY BOARD

8001	
1	+3V3
2	+3V3
3	+5V
4	+5Vstby
5	+6Vstby
6	GND
7	GND
8	GND
9	-8Vstby
10	STB_CONT
11	+12Vstby
12	GND
13	PWR_FAIL

8002	
1	AGND
2	AGND
3	+12VA
4	-12VA
5	DAGND
6	+5VA
7	+5VAD
8	GND
9	GND
10	RELAY
11	AMUTE
12	RGND
13	+12R
14	STANDBY

8003		
1001	JD02	
1	24	DGND
2	23	384 Fs
3	22	DGND
4	21	SEL_PCM/DSD_LFE
5	20	DGND
6	19	DATA_CL/DSD_CENTER
7	18	DGND
8	17	SEL_PCM/DSD_Rs
9	16	DGND
10	15	DATA_LsRs/DSD_Ls
11	14	DGND
12	13	SEL_PCM/DSDRIGHT
13	12	DGND
14	11	DATALR/DSDLEFT
15	10	DGND
16	9	WORDCLK/SEL_DSD
17	8	DGND
18	7	BITCLK/DSDCLK
19	6	DGND
20	5	256Fs
21	4	DGND
22	3	SCL_DAC
23	2	SDA_DAC
24	1	STB_OUT

8004	
1	SCL
2	GND
3	SDA
4	STB_CONT
5	P50

8005	
1	+12V
2	GND
3	+5Vstb
4	-40V
5	on/offA
6	on/offB

8006	
1	P50
2	B
3	G
4	GND
5	R
6	CVBS
7	GND
8	0/6/12V
9	-8Vstby
10	+5V
11	+5V
12	KILL
13	GND
14	PCM_OUT0
15	LRCLK
16	SCLK
17	GND
18	PCM_CLK
19	CENTER
20	STEREO MUTE
21	DIG OUT
22	GND

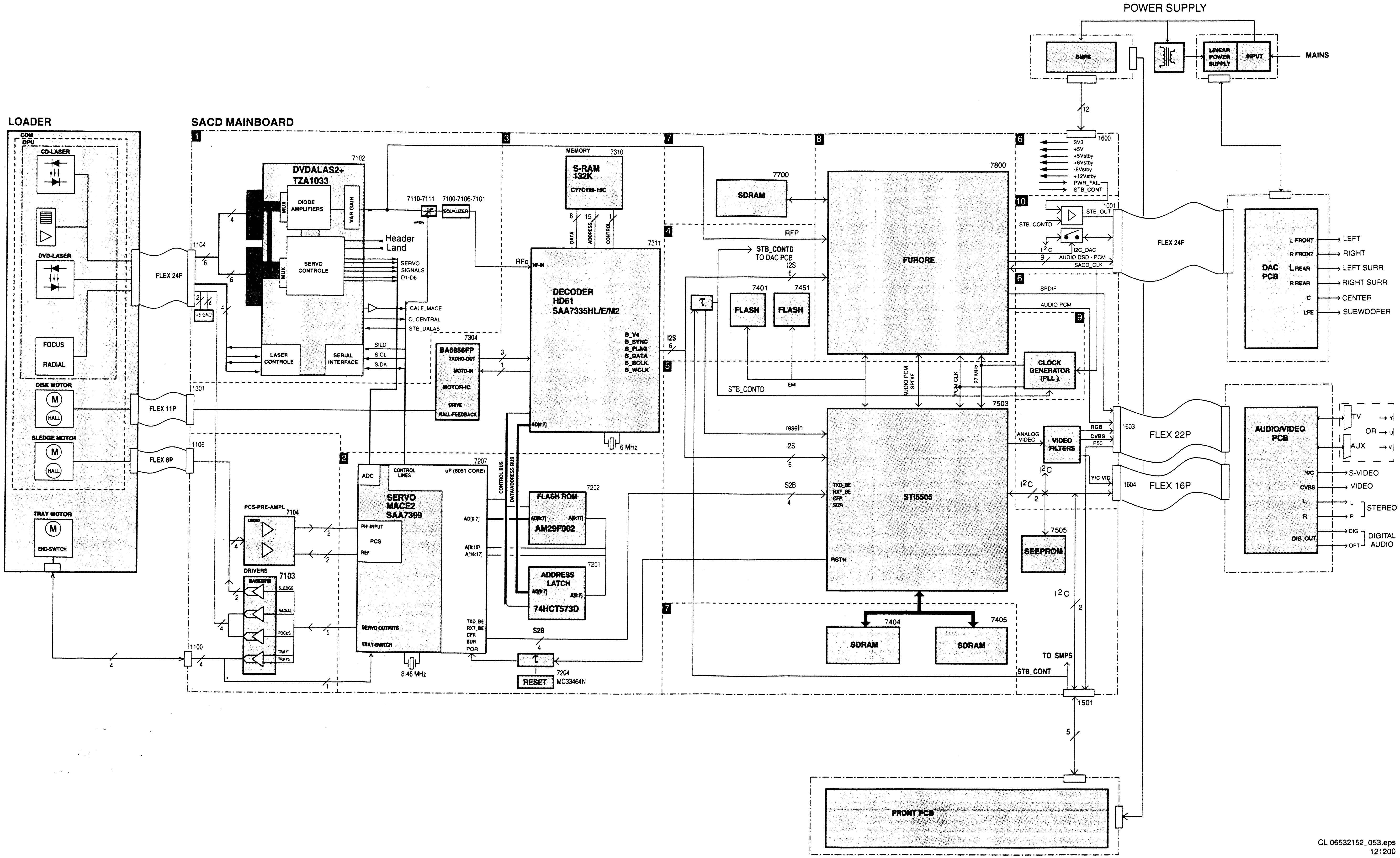
8007	
1	GND
2	HSYNC
3	GND
4	PCM_OUT2
5	GND
6	PCM_OUT1
7	NC
8	SCL
9	12Vstby
10	SDA
11	+6Vstby
12	NC
13	GND
14	C
15	GND
16	Y

8008	
1	LED+
2	LED-
3	on/offA
4	on/offB

CL 06532 12_052.eps
1 21200

General block diagram

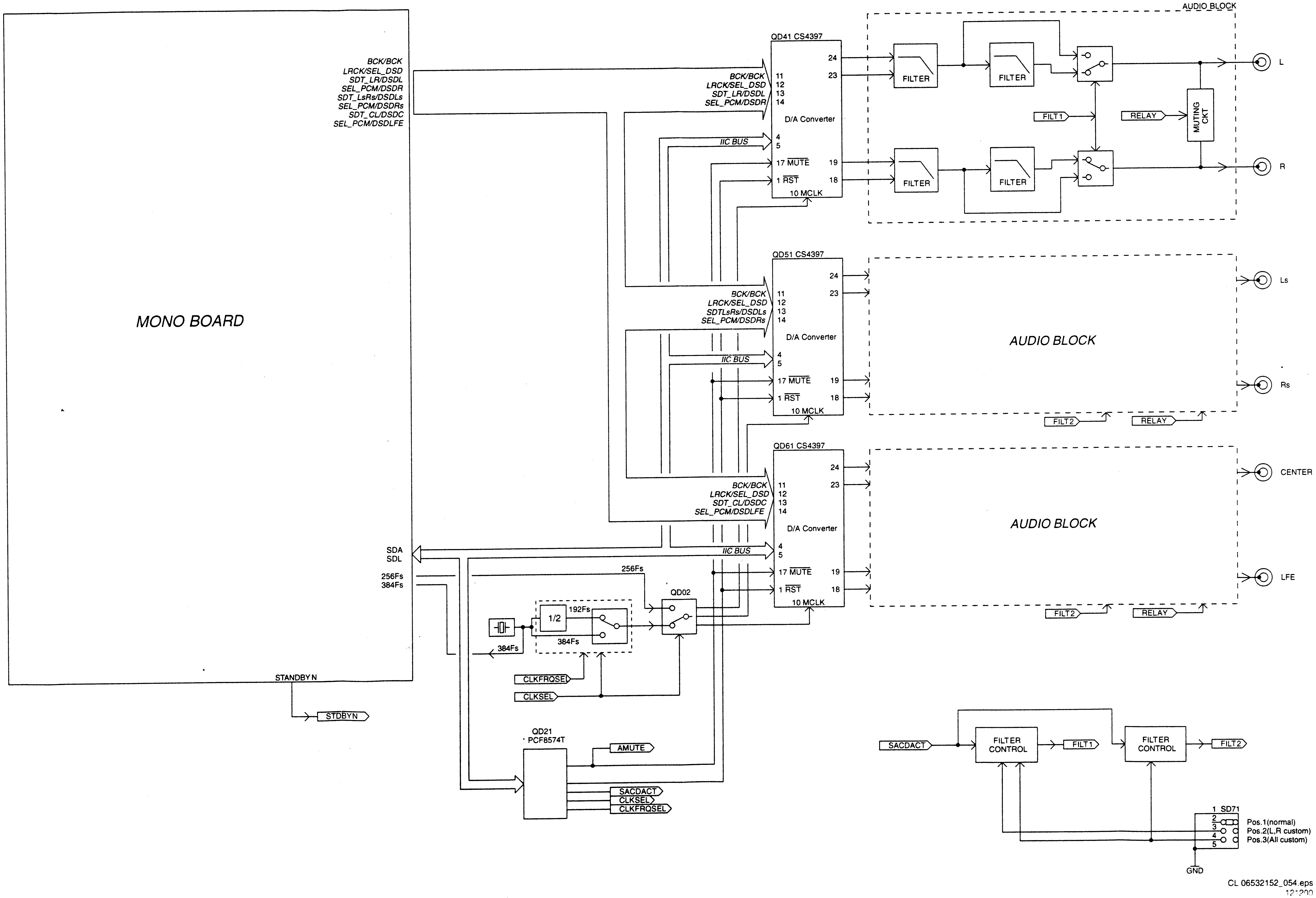
GENERAL BLOCK DIAGRAM


POWER SUPPLY
SMPS
LINEAR POWER SUPPLY
INPUT
MAINS
12
1600
LOADER
CDM
OPU
CD-LASER
DVD-LASER
FOCUS
RADIAL
DISK MOTOR
M
HALL
SLEDGE MOTOR
TRAY MOTOR
END-SWITCH
SACD MAINBOARD
FLEX 24P
1104
FLEX 11P
1301
FLEX 8P
1106
1100
+5 GND
DVDALAS2+
TZA1033
7102
MUX
DIODE AMPLIFIERS
VAR GAIN
SERVO CONTROLE
LASER CONTROLE
SERIAL INTERFACE
Header
Land
SERVO
SIGNALS
D1-D6
CALF_MACE
O_CENTRAL
STB_DALAS
SILD
SICL
SIDA
7110-7111
7100-7106-7101
HPSW
EQUALIZER
RFo
HF-IN
7304
BA6856FP
TACHO-OUT
MOTO-IN
MOTOR-IC
DRIVE
HALL-FEEDBACK
MEMORY
7310
S-RAM
132K
CY7C199-15C
DATA
ADDRESS
CONTROL
DECODER
HD61
SAA7335HL/E/M2
7311
B_V4
B_SYNC
B_FLAG
B_DATA
B_BCLK
B_WCLK
AD[0:7]
6 MHz
I2S
PCS-PRE-AMPL
7104
DRIVERS
7103
S_EDGE
RADIAL
FOCUS
TRAY+
TRAY-
ADC
CONTROL LINES
uP (8051 CORE)
7207
SERVO
MACE2
SAA7399
PHI-INPUT
PCS
REF
SERVO OUTPUTS
TRAY-SWITCH
AD[0:7]
A[8:15]
A[16:17]
TXD_BE
RXT_BE
CFR
SUR
POR
8.46 MHz
CONTROL BUS
DATA/ADDRESS BUS
FLASH ROM
7202
AM29F002
ADDRESS LATCH
7201
74HCT573D
S2B
τ
7204
RESET
MC33464N
SDRAM
7700
RFP
STB_CONTD
TO DAC PCB
7401
7451
FLASH
EMI
STB_CONTD
FURORE
7800
AUDIO PCM
SPDIF
PCM CLK
27 MHz
7503
resetn
STI5505
RSTN
7404
7405
SDRAM
3V3
+5V
+5Vstby
+6Vstby
-8Vstby
+12Vstby
PWR_FAIL
STB_CONT
STB_OUT
1001
I2C_DAC
AUDIO DSD - PCM
SACD_CLK
SPDIF
AUDIO PCM
CLOCK GENERATOR (PLL)
ANALOG VIDEO
VIDEO FILTERS
RGB
CVBS
P50
Y/C VID
I2C
SEEPROM
7505
TO SMPS
STB_CONT
1501
FRONT PCB
FLEX 24P
DAC PCB
L FRONT
R FRONT
L REAR
R REAR
C
LFE
LEFT
RIGHT
LEFT SURR
RIGHT SURR
CENTER
SUBWOOFER
FLEX 22P
1603
FLEX 16P
1604
AUDIO/VIDEO PCB
TV
OR
AUX
Y/C
CVBS
L
R
DIG_OUT
S-VIDEO
VIDEO
STEREO
DIG
OPT
DIGITAL AUDIO

CL 06532152_053.eps
121200

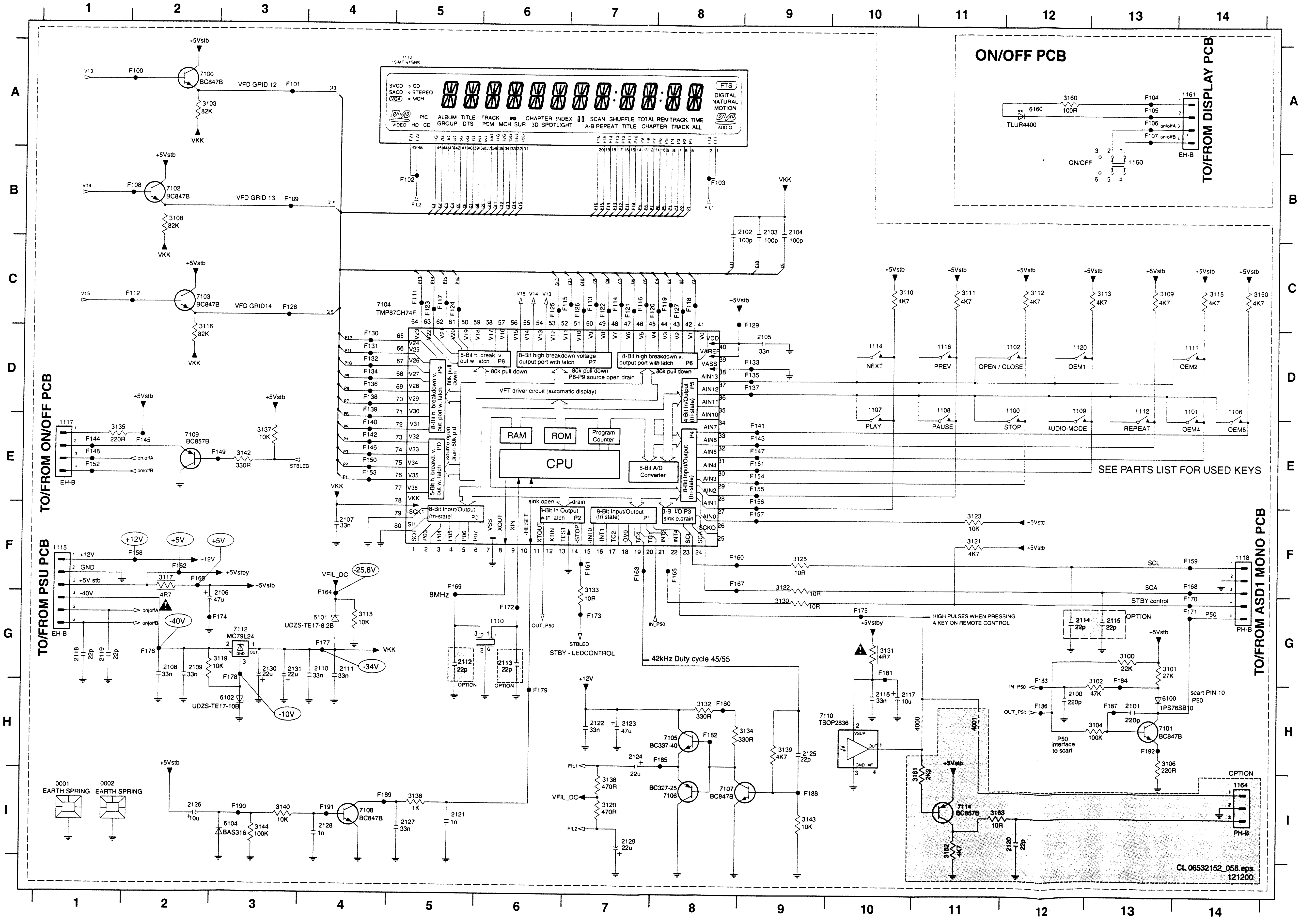
Block diagram DAC PCB

BLOCKDIAGRAM DAC PCB


MONO BOARD
BCK/BCK
LRCK/SEL_DSD
SDT_LR/DSDL
SEL_PCM/DSDR
SDT_LsRs/DSDLs
SEL_PCM/DSDRs
SDT_CL/DSDC
SEL_PCM/DSDLFE
SDA
SDL
256Fs
384Fs
STANDBY N
STDBYN
QD41 CS4397
QD51 CS4397
QD61 CS4397
SDTLsRs/DSDLs
SEL_PCM/DSDRs
SDT_CL/DSDC
SEL_PCM/DSDLFE
D/A Converter
IIC BUS
17 MUTE
1 RST
10 MCLK
11
12
13
14
4
5
24
23
19
18
AUDIO BLOCK
FILTER
FILT1
RELAY
MUTING CKT
L
R
Ls
Rs
CENTER
LFE
FILT2
256Fs
QD02
1/2
192Fs
384Fs
CLKFRQSEL
CLKSEL
QD21
PCF8574T
AMUTE
SACDACT
FILTER CONTROL
FILT1
FILT2
1 SD71
2
3
4
5
Pos.1(normal)
Pos.2(L,R custom)
Pos.3(All custom)
GND
CL 06532152_054.eps
12:200

7. Electrical diagrams and PWB's

Display & on / off panel

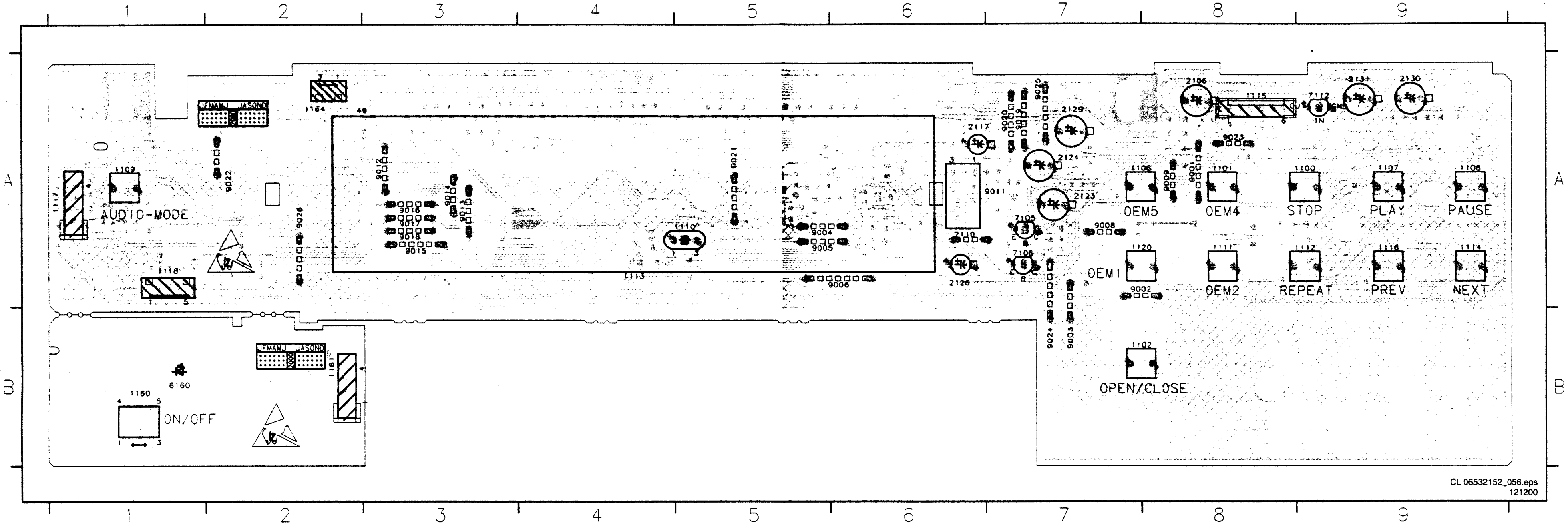

ON/OFF PCB
TO/FROM DISPLAY PCB
TO/FROM ON/OFF PCB
TO/FROM PSU PCB
TO/FROM ASD1 MONO PCB
VFD GRID 12
VFD GRID 13
VFD GRID14
7100 BC847B
7102 BC847B
7103 BC847B
7104 TMP87CH74F
CPU
RAM
ROM
Program Counter
8-Bit A/D Converter
VFT driver circuit (automatic display)
NEXT
PREV
OPEN / CLOSE
OEM1
OEM2
PLAY
PAUSE
STOP
AUDIO-MODE
REPEAT
OEM4
OEM5
SEE PARTS LIST FOR USED KEYS
HIGH PULSES WHEN PRESSING A KEY ON REMOTE CONTROL
42kHz Duty cycle 45/55
STBY - LEDCONTROL
8MHz
7112 MC79L24
7110 TSOP2836
7114 BC857B
P50 interface to scart
scart PIN 10 P50
SCL
SCA
STBY control
OPTION
EARTH SPRING
CL 06532152_055.eps
121200

0001	I1
0002	I1
1100	D12
1101	D14
1102	D12
1106	D14
1107	D10
1108	D11
1109	D12
1110	G6
1111	D14
1112	D13
1113	A5
1114	D10
1115	F1
1116	D11
1117	E1
1118	F14
1120	D12
1160	B13
1161	A14
1164	I14
2100	H12
2101	H13
2102	B9
2103	B9
2104	B9
2105	D9
2106	G3
2107	F4
2108	G2
2109	G2
2110	G4
2111	G4
2112	G5
2113	G6
2114	G12
2115	G13
2116	H10
2117	H10
2118	G1
2119	G1
2120	I12
2121	I5
2122	H7
2123	H7
2124	H7
2125	H9
2126	I2
2127	I5
2128	I4
2129	I7
2130	G3
2131	G3
3100	G13
3101	G13
3102	G13
3103	A2
3104	H13
3106	H13
3108	B2
3109	C13
3110	C10
3111	C11
3112	C12
3113	C13
3115	C14
3116	C2
3117	F2
3118	G4
3119	G3
3120	I7
3121	F11
3122	F9
3123	F11
3125	F9
3130	G9
3131	G10
3132	H8
3133	F7
3134	H9
3135	E1
3136	I5
3137	E3
3138	I7
3139	H9
3140	I3
3142	E3
3143	I9
3144	I3
3150	C14
3160	A12
3161	I11
3162	I11
3163	I11
4000	H11
4001	H11
6100	H13
6101	G4
6102	H3
6104	I3
6160	A12
7100	A2
7101	H13
7102	B2
7103	C2
7104	C4
7105	H8
7106	I8
7107	I8
7108	I4
7109	E2
7110	H10
7112	G3
7114	I11
F100	A2
F101	A3
F102	B5
F103	B8
F104	A13
F105	A13
F106	A13
F107	A13
F108	B2
F109	B3
F111	C5
F112	C2
F113	C7
F114	C7
F115	C6
F116	C7
F117	C5
F118	C8
F119	C8
F120	C7
F121	C7
F122	C7
F123	C5
F124	C5
F125	C6
F126	C7
F127	C8
F128	C3
F129	C9
F130	D4
F131	D4
F132	D4
F133	D9
F134	D4
F135	D9
F136	D4
F137	D9
F138	D4
F139	D4
F140	E4
F141	E9
F142	E4
F143	E9
F144	E1
F145	E2
F146	E4
F147	E9
F148	E1
F149	E3
F150	E4
F151	E9
F152	E1
F153	E4
F154	E9
F155	E9
F156	E9
F157	F9
F158	F2
F159	F14
F160	F8
F161	F7
F162	F2
F163	F7
F164	F4
F165	F8
F166	F2
F167	F8
F168	F14
F169	F5
F170	G14
F171	G14
F172	G6
F173	G7
F174	G3
F175	G10
F176	G2
F177	G4
F178	G3
F179	H6
F180	H8
F181	G10
F182	H8
F183	G12
F184	G13
F185	H8
F186	H12
F187	H13
F188	I9
F189	I4
F190	I3
F191	I4
F192	H13

Layout Display & on / off panel (top view)

DISPLAY & ON/OFF PANEL TOP VIEW

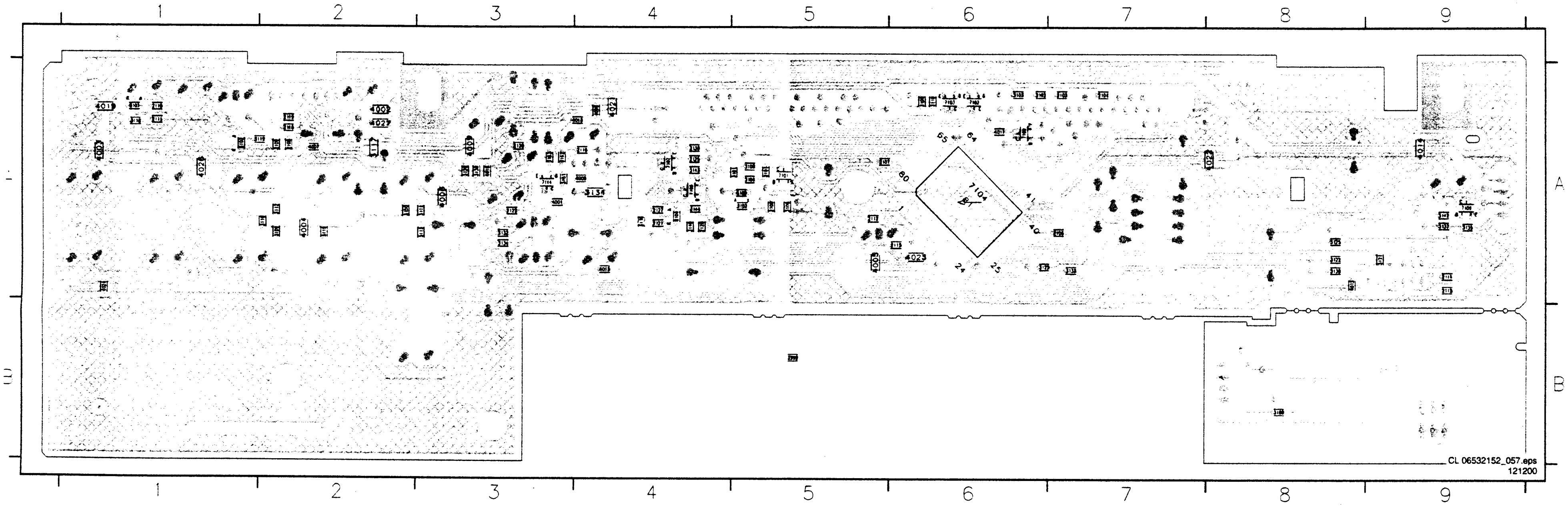
1100	A9
1101	A8
1102	B7
1106	A7
1107	A9
1108	A9
1109	A1
1110	A5
1111	A8
1112	A9
1113	A4
1114	A9
1115	A8
1116	A9
1117	A1
1118	A1
1120	A7
1160	B1
1161	B2
1164	A2
2106	A8
2117	A6
2123	A7
2124	A7
2126	A6
2129	A7
2130	A9
2131	A9
6160	B1
7105	A7
7106	A7
7110	A6
7112	A9
9001	A8
9002	A7
9003	A7
9004	A5
9005	A5
9006	A6
9008	A7
9009	A8
9011	A6
9012	A3
9013	A3
9014	A3
9015	A3
9016	A3
9017	A3
9018	A3
9019	A7
9020	A7
9021	A5
9022	A2
9023	A8
9024	A7
9025	A7
9026	A2


1
2
3
4
5
6
7
8
9
A
B
1109
AUDIO-MODE
1117
1118
9022
9026
1164
9012
9016
9017
9018
9015
9014
9013
9021
1110
1113
9004
9005
9006
9011
7110
2117
2126
7105
7106
9020
9019
9025
2129
2124
2123
9024
9003
2106
1115
7112
2131
2130
9023
9009
9001
9008
9002
1106
OEM5
1101
OEM4
1100
STOP
1107
PLAY
1108
PAUSE
1120
OEM1
1111
OEM2
1112
REPEAT
1116
PREV
1114
NEXT
1102
OPEN/CLOSE
6160
1160
ON/OFF
1161
CL 06532152_056.eps
121200

Layout Display & on / off panel (bottom view)

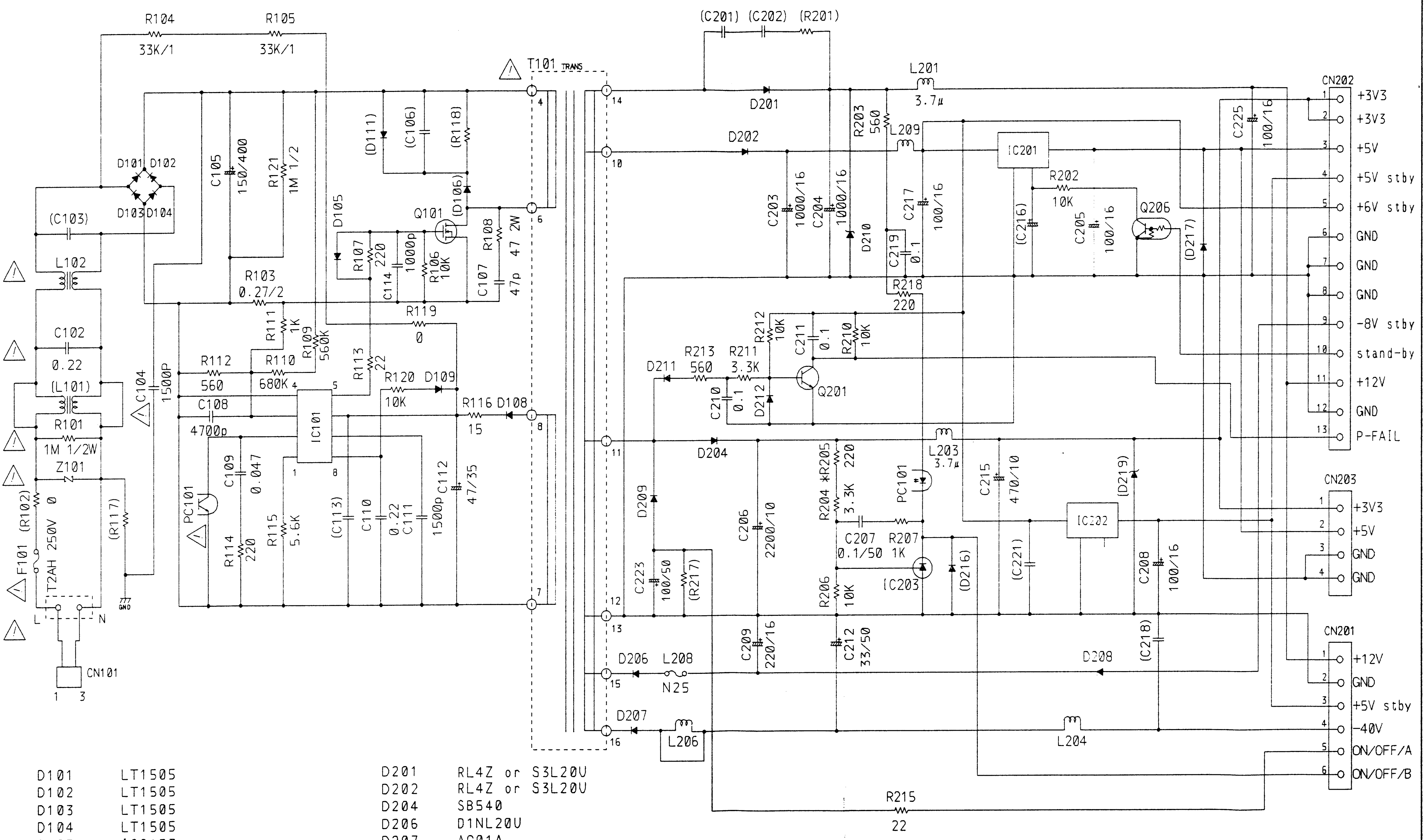
DISPLAY & ON/OFF PANEL BOTTOM VIEW

2100	A5
2101	A5
2102	A6
2103	A7
2104	A7
2105	A7
2107	A5
2108	A2
2109	A2
2110	A1
2111	A1
2112	A5
2113	A6
2114	A9
2115	A9
2116	A4
2118	A2
2119	A2
2120	A3
2121	A4
2122	A3
2125	A4
2127	A4
2128	A4
3100	A5
3101	A5
3102	A5
3103	A6
3104	A5
3106	A5
3108	A6
3109	A2
3110	A2
3111	A3
3112	A2
3113	A3
3115	A2
3116	A6
3117	A2
3118	A1
3119	A2
3120	A3
3121	A9
3122	A8
3123	A6
3125	A8
3130	A8
3131	A4
3132	A3
3133	A7
3134	A3
3135	A9
3136	A4
3137	A9
3138	A3
3139	A4
3140	A4
3142	A9
3143	A4
3144	A4
3150	A2
3160	B8
3161	A3
3162	A3
3163	A3
3999	B5
4000	A4
4001	A3
4002	A2
4003	A1
4004	A2
4005	A5
4006	A3
4007	A2
4008	A4
4009	A3
4013	A8
4014	A9
4015	A4
4016	A3
4017	A6
4018	A4
4019	A1
4021	A4
4022	A8
4023	A6
4024	A1
4026	A1
4027	A2
6100	A5
6101	A1
6102	A1
6104	A4
7100	A6
7101	A5
7102	A6
7103	A6
7104	A6
7107	A4
7108	A4
7109	A9
7114	A3



Switched mode power supply

SWITCHED MODE POWER SUPPLY
FOR ORIENTATION ONLY


R104
33K/1
R105
33K/1
T101 TRANS
(C201) (C202) (R201)
L201
3.7μ
D201
D202
R203
560
L209
IC201
R202
10K
Q206
C205
100/16
(C216)
(D217)
C225
100/16
CN202
+3V3
+3V3
+5V
+5V stby
+6V stby
GND
GND
GND
-8V stby
stand-by
+12V
GND
P-FAIL
D101 D102
D103 D104
C105
150/400
R121
1M 1/2
(D111)
(C106)
(R118)
(D106)
Q101
D105
R107
220
C114
1000p
R106
10K
R108
47 2W
C107
47p
(C103)
L102
R103
0.27/2
R119
0
R111
1K
R109
560K
C102
0.22
(L101)
R101
1M 1/2W
Z101
C104
1500P
R112
560
R110
680K
R113
22
R120
10K
D109
R116
15
D108
C108
4700p
IC101
C109
0.047
C112
47/35
PC101
R114
220
R115
5.6K
(C113)
C110
0.22
C111
1500p
F101
T2AH 250V
(R102)
0
(R117)
L
N
GND
CN101
1 3
C203
1000/16
C204
1000/16
D210
C217
100/16
C219
0.1
R218
220
R212
10K
C211
0.1
R210
10K
R213
560
R211
3.3K
D211
C210
0.1
D212
Q201
D204
L203
3.7μ
R204
3.3K
*R205
220
PC101
C215
470/10
(D219)
IC202
D209
C206
2200/10
C207
0.1/50
R207
1K
IC203
(D216)
(C221)
C208
100/16
C223
100/50
(R217)
R206
10K
CN203
+3V3
+5V
GND
GND
C209
220/16
C212
33/50
(C218)
D206
L208
N25
D208
D207
L206
L204
CN201
+12V
GND
+5V stby
-40V
ON/OFF/A
ON/OFF/B
R215
22
4
6
8
7
14
10
11
12
13
15
16

D101	LT1505
D102	LT1505
D103	LT1505
D104	LT1505
D105	ISS133
(D106)	
D108	AU02Z
D109	MA4220 or MTZ22
Q101	2SK2651
IC101	KA7552
PC101	ON3171 or PC123

D201	RL4Z or S3L20U
D202	RL4Z or S3L20U
D204	SB540
D206	D1NL20U
D207	AG01A
D208	LT1505 or 1N4005
D209	AU02Z
D210	P4KA15
D211	1SS133
D212	1SS133
(D217)	
Q201	2SC17400
Q206	DTC114
IC201	PQ05RD08 or PQ05RD11 or KA78R05
IC202	PQ05RD08 or PQ05RD11 or KA78R05
IC203	AN1431T

( ) : no stuff

* 調整抵抗(Adjustable)

symbol	min	typ	max
*R205	0	560	1K

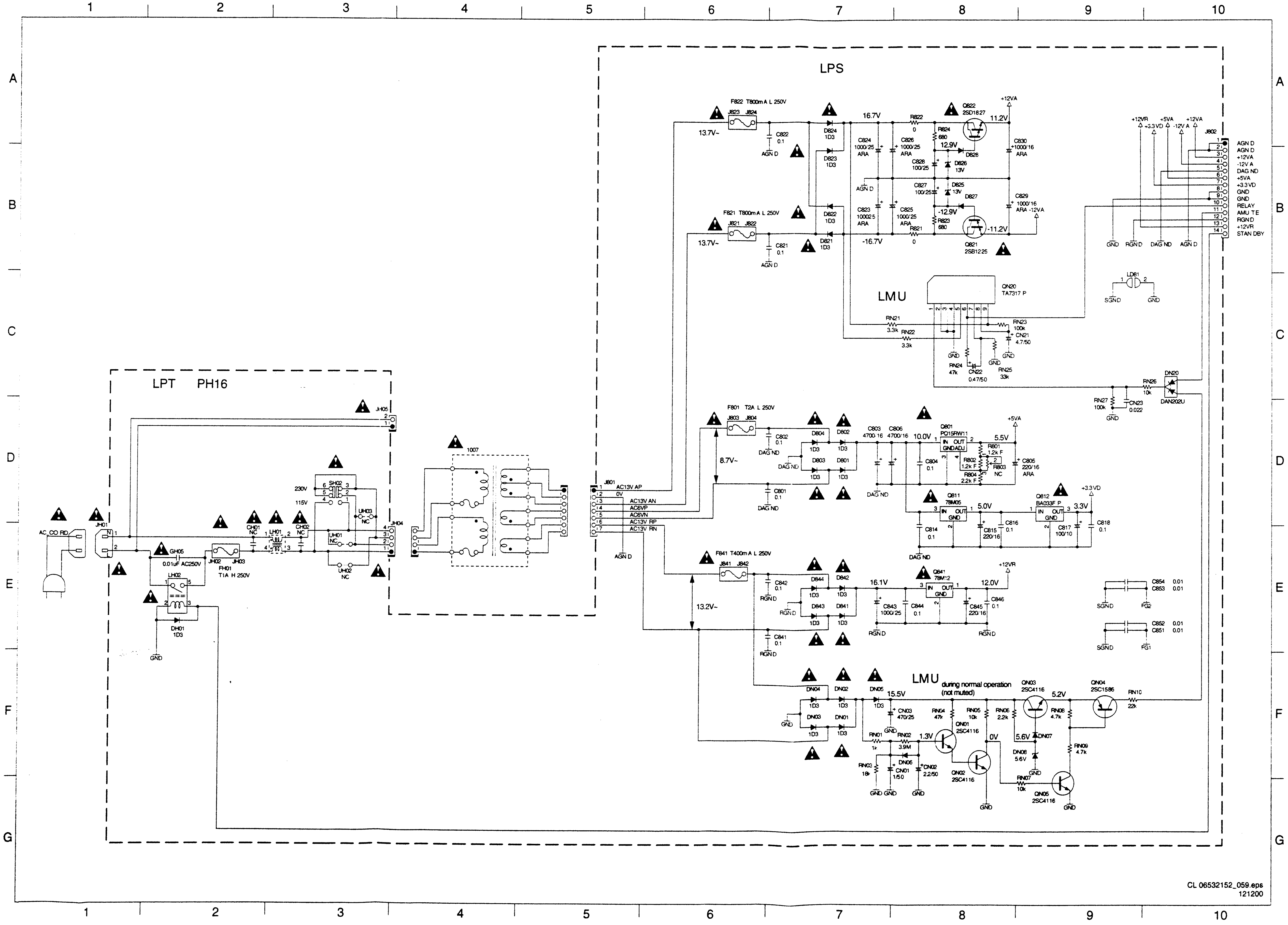
SACD

CL 06532152_058.eps
121200

LPSU-L2-2N

LPSU-L2-2N

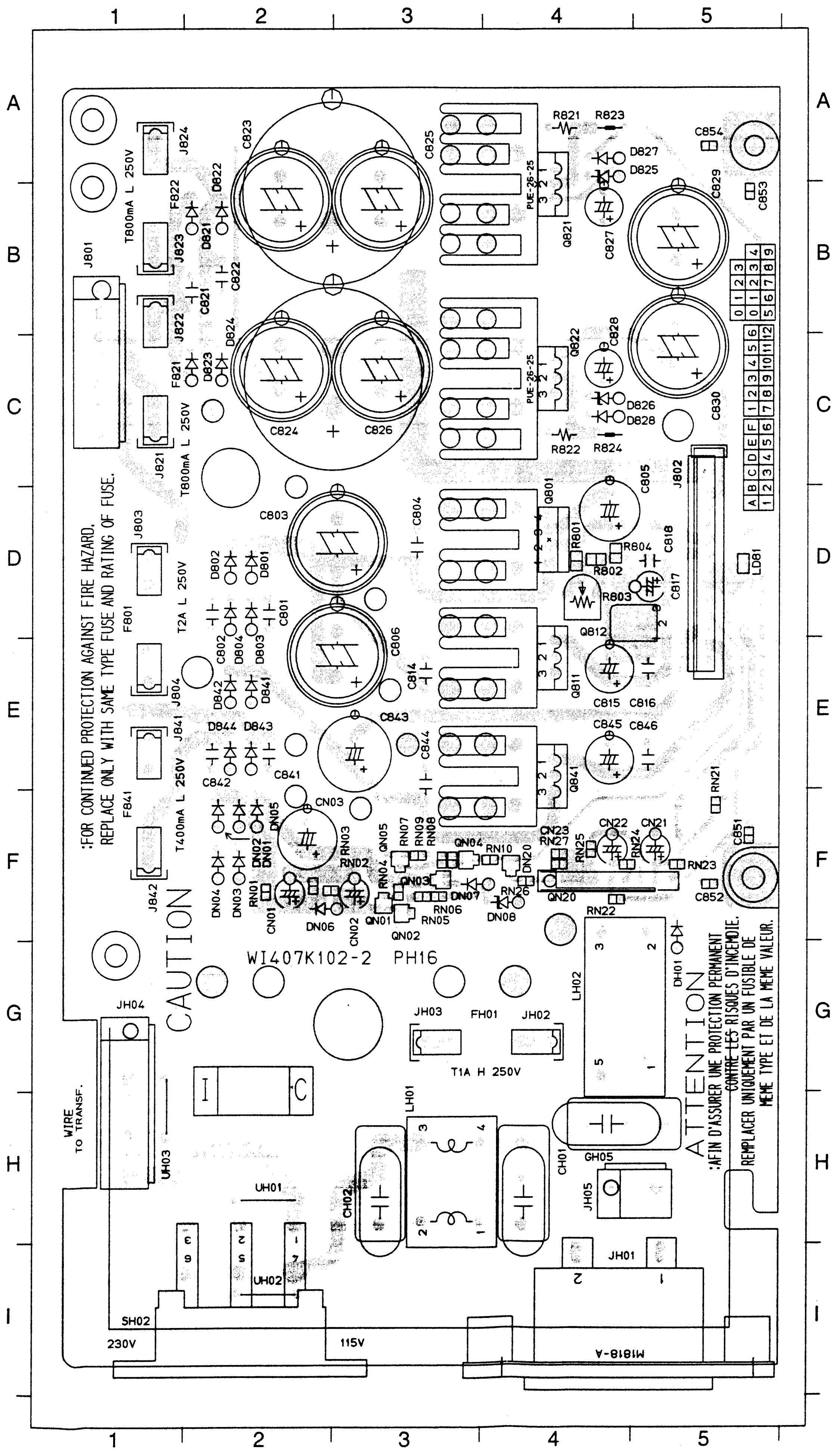
CH01 E2	CN21 C8	C803 D7	C815 D8	C822 A7	C827 B8	C842 E7	C851 E10	DN01 F7	DN06 F8	D802 D7	D823 B7	D828 B8	FH01 E2	GH05 E2	JH05 D4	J821 B6	J842 E6	QN02 F8	Q801 D8	Q841 E8	RN05 F8	RN10 F9	RN25 C8	R803 D8	R824 A8
CH02 E3	CN22 C8	C804 D8	C816 D8	C823 B7	C828 B8	C843 E7	C852 E10	DN02 F7	DN07 F9	D803 D7	D824 A7	D841 E7	F801 D6	JH01 E1	J801 D5	J822 B6	LD81 C9	QN03 F9	Q811 D8	RN01 F7	RN06 F8	RN21 C8	RN26 C10	R804 D8	SH02 D3
CN01 F8	CN23 D9	C805 D8	C817 D9	C824 B7	C829 B8	C844 E8	C853 E10	DN03 F7	DN09 F9	D804 D7	D825 B8	D842 E7	F821 B6	JH02 E2	J802 A10	J823 A6	LH01 E3	QN04 F9	Q812 D9	RN02 F8	RN07 G9	RN22 C8	RN27 D9	R821 B8	UH01 E3
CN02 F8	C801 D7	C806 D7	C818 D9	C825 B8	C830 B8	C845 E8	C854 E10	DN04 F7	DN20 C10	D821 B7	D826 B8	D843 E7	F822 A6	JH03 E2	J803 D6	J824 A6	LH02 E2	QN05 G9	Q821 B8	RN03 F7	RN08 F9	RN23 C8	R801 D8	R822 A8	UH02 E3
CN03 F8	C802 D7	C814 D8	C821 B7	C826 B8	C841 E7	C846 E8	DH01 E2	DN05 F7	D801 D7	D822 B7	D827 B8	D844 E7	F841 E6	JH04 E4	J804 D6	J841 E6	QN01 F8	QN20 C8	Q822 A8	RN04 F8	RN09 F9	RN24 C8	R802 D8	R823 B8	UH03 D3

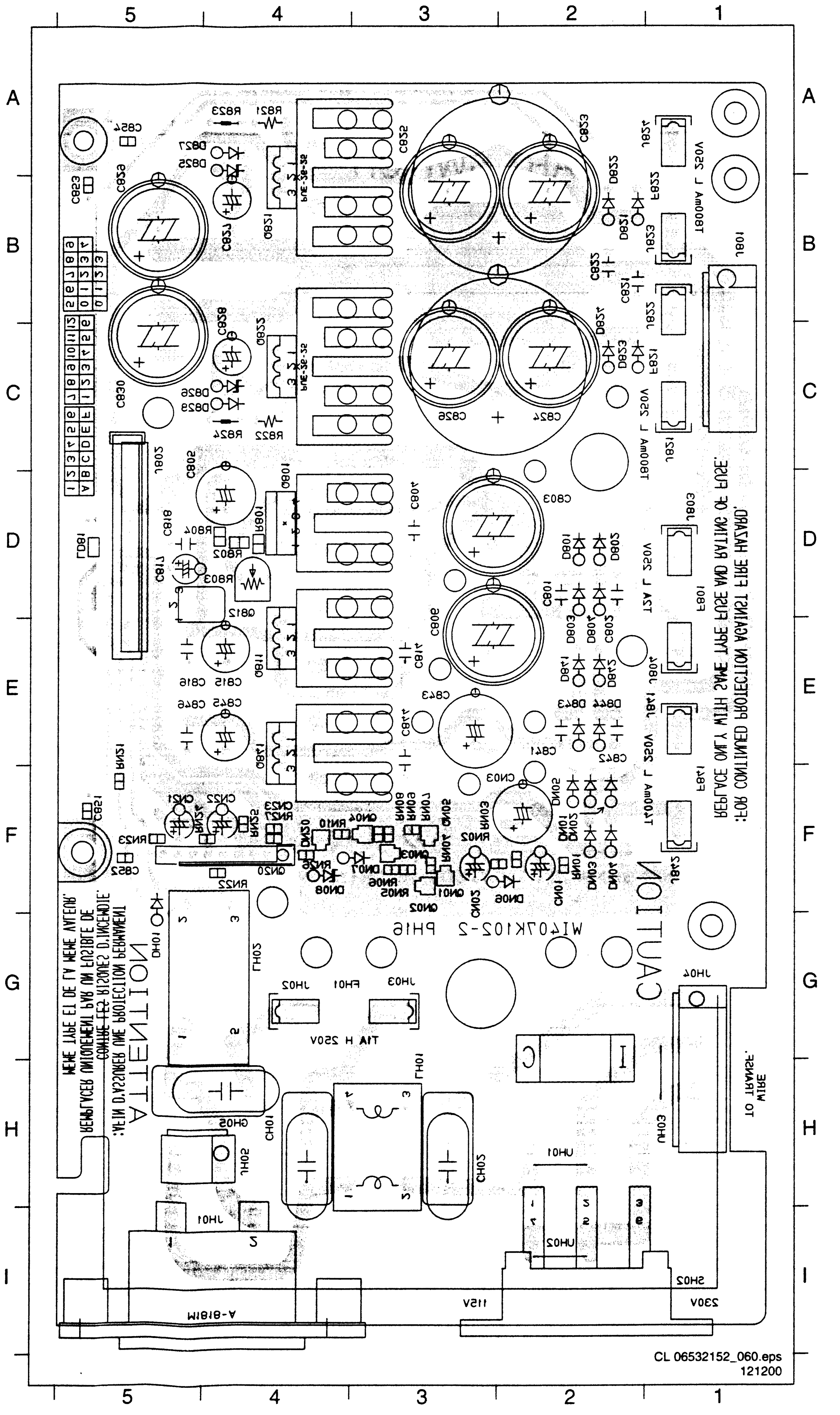


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
LPS
LMU
LPT PH16
F822 T800m A L 250V
J823 J824
13.7V~
C822 0.1
AGN D
D824 1D3
D823 1D3
16.7V
R822 0
Q822 2SD1827
11.2V
+12VA
R824 680
12.9V
D828
D826 13V
C824 1000/25 ARA
C826 1000/25 ARA
C828 100/25
C830 1000/16 ARA
C827 100/25
D825 13V
D827
C829 1000/16 ARA
-12VA
F821 T800m A L 250V
J821 J822
D822 1D3
D821 1D3
C823 1000/25 ARA
C825 1000/25 ARA
-12.9V
R823 680
R821 0
-16.7V
-11.2V
Q821 2SB1225
C821 0.1
+12VR
+3.3VD
+5VA
-12V A
J802
AGN D
AGN D
+12VA
-12V A
DAG ND
+5VA
+3.3VD
GND
GND
RELAY
AMU TE
RGN D
+12VR
STAN DBY
GND
RGN D
DAG ND
AGN D
QN20 TA7317 P
RN21 3.3k
RN22 3.3k
RN23 100k
CN21 4.7/50
RN24 47k
CN22 0.47/50
RN25 33k
LD81
SGN D
RN26 10k
DN20 DAN202U
RN27 100k
CN23 0.022
JH05
1007
F801 T2A L 250V
J803 J804
C802 0.1
DAG ND
8.7V~
D804 1D3
D802 1D3
D803 1D3
D801 1D3
C803 4700/16
C806 4700/16
10.0V
Q801 PQ15RW11
IN OUT
GND ADJ
5.5V
+5VA
R801 1.2k F
R802 1.2k F
R804 2.2k F
R803 NC
C805 220/16 ARA
C804 0.1
C801 0.1
Q811 78M05
5.0V
C814 0.1
C815 220/16
C816 0.1
Q812 BA033F P
3.3V
+3.3VD
C817 100/10
C818 0.1
J801
AC13V AP
0V
AC13V AN
AC6VP
AC6VN
AC13V RP
AC13V RN
F841 T400m A L 250V
J841 J842
C842 0.1
RGN D
13.2V~
D844 1D3
D842 1D3
D843 1D3
D841 1D3
16.1V
Q841 78M12
12.0V
+12VR
C843 1000/25
C844 0.1
C845 220/16
C846 0.1
C841 0.1
C854 0.01
C853 0.01
C852 0.01
C851 0.01
FG2
FG1
230V
115V
SH02
UH03 NC
UH01 NC
UH02 NC
JH04
CH01 NC
LH01
CH02 NC
AC_CO RD
JH01
GH05 0.01uF AC250V
JH02 JH03
FH01 T1A H 250V
LH02
DH01 1D3
GND
during normal operation (not muted)
DN04 1D3
DN02 1D3
DN05 1D3
DN03 1D3
DN01 1D3
15.5V
CN03 470/25
RN04 47k
RN05 10k
RN06 2.2k
QN03 2SC4116
5.2V
RN08 4.7k
QN04 2SC1586
RN10 22k
QN01 2SC4116
1.3V
0V
5.6V
DN07
DN08 5.6V
RN09 4.7k
RN01 1k
RN02 3.9M
DN06
RN03 18k
CN01 1/50
CN02 2.2/50
QN02 2SC4116
RN07 10k
QN05 2SC4116

CL 06532152_059.eps
121200

Layout LPSU-L2-2N


1
2
3
4
5
A
B
C
D
E
F
G
H
I
J801
J824
J823
J822
J821
F822
F821
T800mA L 250V
T800mA L 250V
D821
D822
D823
D824
C821
C822
C823
C824
C825
C826
R821
R823
R822
R824
D825
D826
D827
D828
Q821
Q822
C827
C828
C829
C830
C853
C854
PUE-26-25
J802
LD81
C803
C804
C805
C806
Q801
R801
R802
R803
R804
C817
C818
Q812
Q811
C814
C815
C816
C843
C844
C845
C846
Q841
J803
T2A L 250V
F801
D801
D802
D803
D804
C801
C802
J804
D841
D842
D843
D844
C841
C842
J841
T400mA L 250V
F841
J842
CN01
CN02
CN03
CN21
CN22
CN23
DN01
DN02
DN03
DN04
DN05
DN06
DN07
DN08
DN20
QN01
QN02
QN03
QN04
QN05
QN20
RN01
RN02
RN03
RN04
RN05
RN06
RN07
RN08
RN09
RN10
RN21
RN22
RN23
RN24
RN25
RN26
RN27
C851
C852
:FOR CONTINUED PROTECTION AGAINST FIRE HAZARD.
REPLACE ONLY WITH SAME TYPE FUSE AND RATING OF FUSE.
CAUTION
WI407K102-2 PH16
JH03
FH01
JH02
T1A H 250V
LH02
DH01
ATTENTION
:AFIN D'ASSURER UNE PROTECTION PERMANENT
CONTRE LES RISQUES D'INCENDIE.
REMPLACER UNIQUEMENT PAR UN FUSIBLE DE
MEME TYPE ET DE LA MEME VALEUR.
JH04
WIRE TO TRANSF.
UH03
LH01
CH01
CH02
GH05
JH05
UH01
UH02
JH01
SH02
230V
115V
M1818-A


5
4
3
2
1
A
B
C
D
E
F
G
H
I

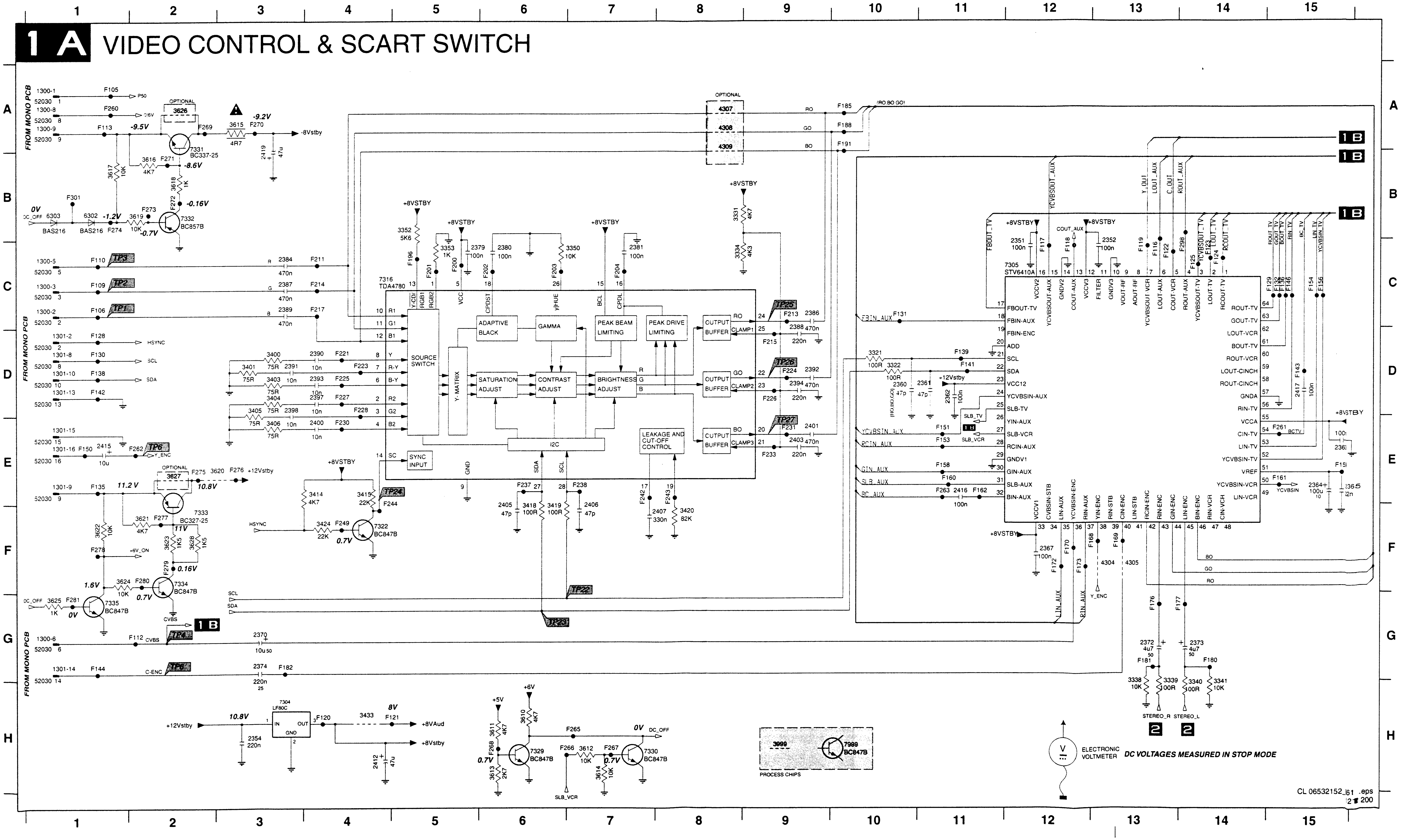
CL 06532152_060.eps
121200

CN01	F2
CN02	F3
CN03	F2
CN21	F5
CN22	F4
CN23	F4
CH01	H4
CH02	H3
C801	D2
C802	E2
C803	D2
C804	D3
C805	D5
C806	E3
C814	E3
C815	E4
C816	E5
C817	D5
C818	D5
C821	B2
C822	B2
C823	A2
C824	C2
C825	A3
C826	C3
C827	B4
C828	C4
C829	B5
C830	C5
C841	E2
C842	E2
C843	E3
C844	E3
C845	E4
C846	E5
C851	F5
C852	F5
C853	B5
C854	A5
DN01	F2
DN02	F2
DN03	F2
DN04	F2
DN05	F2
DN06	F3
DN07	F3
DN08	F4
DN20	F4
DH01	G5
D801	D2
D802	D2
D803	E2
D804	E2
D821	B2
D822	B2
D823	C2
D824	C2
D825	A4
D826	C4
D827	A4
D828	C4
D841	E2
D842	E2
D843	E2
D844	E2
FH01	G3
F801	D1
F821	C1
F822	B1
F841	F1
GH05	H4
JH01	I4
JH02	G4
JH03	G3
JH04	G1
JH05	H4
J801	B1
J802	C5
J803	D1
J804	E1
J821	C1
J822	B2
J823	B2
J824	A1
J841	E1
J842	F1
LH01	H3
LH02	G4
LD81	D5
QN01	F3
QN02	F3
QN03	F3
QN04	F3
QN05	F3
QN20	F4
Q801	D4
Q811	E4
Q812	D4
Q821	B4
Q822	C4
Q841	E4
RN01	F2
RN02	F3
RN03	F3
RN04	F3
RN05	F3
RN06	F3
RN07	F3
RN08	F3
RN09	F3
RN10	F4
RN21	F5
RN22	F4
RN23	F5
RN24	F5
RN25	F4
RN26	F4
RN27	F4
R801	D4
R802	D4
R803	D4
R804	D4
R821	A4
R822	C4
R823	A4
R824	C4
SH02	I1
UH01	H2
UH02	I2
UH03	H1

AV Board (Europe): Video control & SCART switch

1300-1	A1
1300-2	C1
1300-3	C1
1300-5	C1
1300-6	G1
1300-8	A1
1300-9	A1
1301-10	D1
1301-13	D1
1301-14	G1
1301-15	E1
1301-16	E1
1301-2	D1
1301-8	D1
1301-9	E1
2351	C12
2352	C13
2354	H3
2360	D10
2361	D11
2362	D11
2363	E15
2364	E15
2365	E15
2367	F12
2370	G3
2372	G13
2373	G14
2374	G3
2379	C5
2380	C6
2381	C7
2384	C3
2386	C9
2387	C3
2388	D9
2389	C3
2390	D4
2391	D3
2392	D9
2393	D4
2394	D9
2397	D4
2398	D3
2400	E4
2401	E9
2403	E9
2405	F6
2406	F7
2407	F8
2412	H4
2415	E1
2416	E11
2417	D15
2419	B3
3321	D10
3322	D10
3331	B8
3334	C8
3338	H13
3339	H13
3340	H14
3341	H14
3350	C7
3352	B5
3353	C5
3400	D3
3401	D3
3403	D3
3404	D3
3405	D3
3406	E3
3414	E4
3415	E4
3418	F6
3419	F6
3420	F8
3424	F4
3433	H4
3610	H6
3611	H6
3612	H7
3613	H6
3614	H7
3615	A3
3616	B2
3617	B1
3618	B2
3619	B2
3620	E3
3621	F2
3622	F1
3623	F2
3624	F1
3625	G1
3626	A2
3627	E2
3628	F2
3999	H9
4304	F13
4305	F13
4307	A8
4308	A8
4309	A8
6302	B1
6303	B1
7304	H3
7305	C11
7316	C4
7322	F4
7329	H6
7330	H7
7331	A2
7332	B2
7333	F2
7334	F2
7335	G1
7999	H10
F105	A1
F106	C1
F109	C1
F110	C1
F112	G2
F113	A1
F116	C13
F117	C12
F118	C12
F119	C13
F120	H4
F121	H5
F122	C13
F123	C14
F124	C14
F125	C14
F128	D1
F129	C15
F130	D1
F131	C10
F132	C15
F135	E1
F136	C15
F138	D1
F139	D11
F141	D11
F142	D1
F143	D15
F144	G1
F146	C15
F150	E1
F151	E11
F153	E11
F154	C15
F156	C15
F158	E11
F159	E15
F160	E11
F161	E15
F162	E11
F168	F13
F169	F13
F170	F12
F172	F12
F173	F12
F176	G13
F177	G14
F180	G14
F181	G13
F182	G3
F185	A10
F188	A10
F191	A10
F196	C5
F200	C5
F201	C5
F202	C6
F203	C6
F204	C7
F211	C4
F213	C9
F214	C4
F215	D9
F217	C4
F221	D4
F223	D4
F224	D9
F225	D4
F226	D9
F227	D4
F228	D4
F230	E4
F231	E9
F233	E9
F237	E6
F238	E7
F242	E7
F243	E8
F244	F4
F249	F4
F260	A1
F261	E15
F262	E2
F263	E11
F265	H7
F266	H7
F267	H7
F268	H6
F269	A2
F270	A3
F271	B2
F272	B2
F273	B2
F274	B1
F275	E2
F276	E3
F277	F2
F278	F1
F279	F2
F280	F2
F281	G1
F298	C14
F301	B1

1 A VIDEO CONTROL & SCART SWITCH


1
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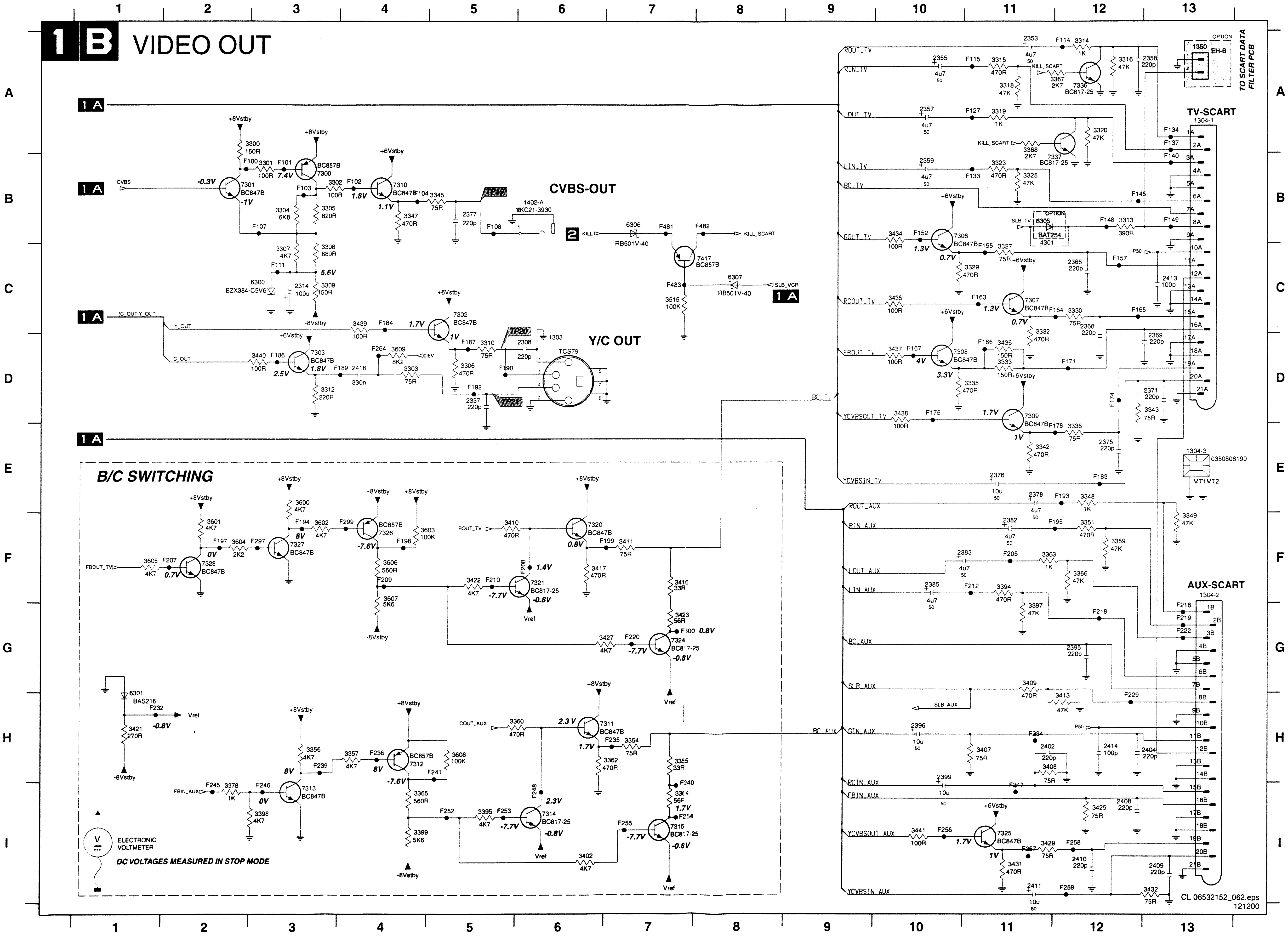
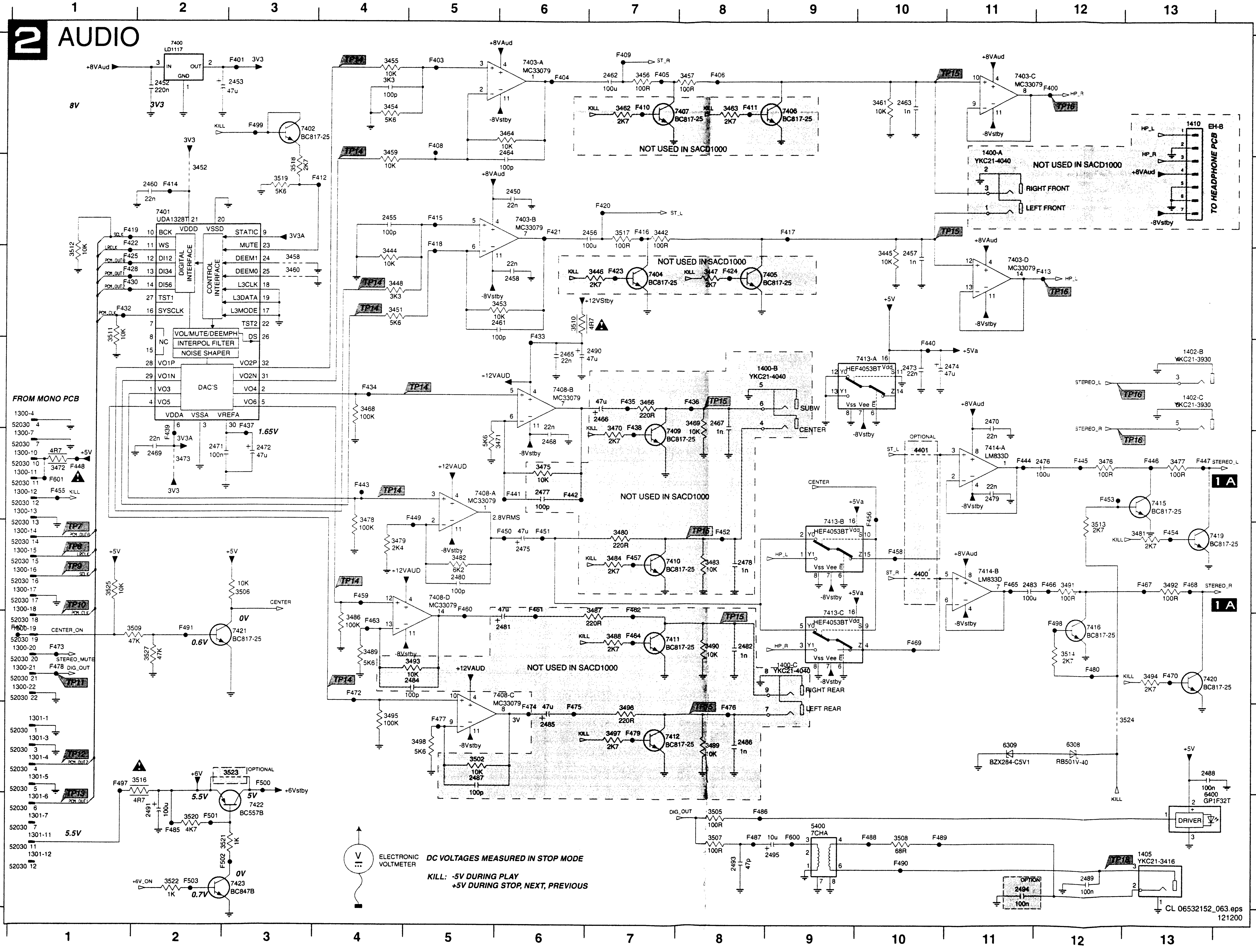
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
FROM MONO PCB
1300-1
52030
F105
P50
1300-8
F260
OPTIONAL
3626
-9.2V
3615
4R7
F270
-8Vstby
1300-9
F113
-9.5V
F269
7331
BC337-25
3616
4K7
F271
-8.6V
3617
10K
3618
1K
2419
47u
F301
0V
DC_OFF
6303
BAS216
6302
-1.2V
F274
3619
10K
-0.7V
F272
-0.16V
F273
7332
BC857B
1300-5
F110
TP3
2384
470n
F211
1300-3
F109
TP2
2387
470n
F214
1300-2
F106
TP1
2389
470n
F217
1301-2
F128
HSYNC
1301-8
F130
SCL
1301-10
F138
SDA
1301-13
F142
3400
75R
2390
10n
F221
3401
75R
2391
F223
3403
2393
F225
3404
2397
F227
3405
2398
F228
3406
2400
F230
1301-15
1301-16
F150
2415
10u
F262
TP6
Y_ENC
OPTIONAL
3627
F275
3620
F276
+12Vstby
1301-9
F135
11.2 V
10.8V
7333
BC327-25
3621
4K7
F277
11V
3622
10K
F278
+6V_ON
3623
1K5
3628
1K5
F279
0.16V
1.6V
3624
10K
F280
0.7V
7334
BC847B
DC_OFF
3625
1K
F281
0V
7335
BC847B
CVBS
1 B
1300-6
F112
CVBS
TP4
2370
10u
1301-14
F144
C-ENC
TP8
2374
220n
F182
+8VSTBY
3352
5K6
F196
F201
3353
1K
F200
2379
100n
F202
2380
100n
3350
10K
F203
F204
2381
100n
7316
TDA4780
R1
G1
B1
Y
R-Y
B-Y
R2
G2
B2
SC
Y-CD
RGB1
RGB2
VCC
CPDST
yHUE
BCL
CPDL
SOURCE SWITCH
Y-MATRIX
ADAPTIVE BLACK
GAMMA
PEAK BEAM LIMITING
PEAK DRIVE LIMITING
SATURATION ADJUST
CONTRAST ADJUST
BRIGHTNESS ADJUST
OUTPUT BUFFER
CLAMP1
CLAMP2
CLAMP3
RO
GO
BO
SYNC INPUT
I2C
LEAKAGE AND CUT-OFF CONTROL
GND
SDA
SCL
3414
4K7
3415
22K
TP24
F244
HSYNC
3424
22K
F249
7322
BC847B
0.7V
F237
2405
47p
3418
100R
3419
100R
F238
2406
47p
F242
F243
2407
330n
3420
82K
TP22
TP23
TP25
F213
2386
2388
470n
F215
220n
TP26
F224
2392
2394
F226
TP27
F231
2401
2403
F233
OPTIONAL
4307
4308
4309
F185
F188
F191
(RO BO GO)
3331
4K7
3334
4K3
2351
100n
F117
COUT_AUX
F118
2352
100n
F119
F116
F122
F298
F125
F124
7305
STV6410A
FBOUT-TV
FBIN-AUX
FBIN-ENC
ADD
SCL
SDA
VCC12
YCVBSIN-AUX
SLB-TV
YIN-AUX
SLB-VCR
RCIN-AUX
GNDV1
GIN-AUX
SLB-AUX
BIN-AUX
ROUT-TV
GOUT-TV
LOUT-VCR
BOUT-TV
ROUT-VCR
LOUT-CINCH
ROUT-CINCH
GNDA
RIN-TV
VCCA
CIN-TV
LIN-TV
YCVBSIN-TV
VREF
YCVBSIN-VCR
LIN-VCR
YCVBSOUT-AUX
Y_OUT
LOUT_AUX
C_OUT
ROUT_AUX
YCVBSOUT_TV
LOUT_TV
ROUT_TV
FBIN_AUX
F131
3321
100R
3322
100R
2360
47p
2361
47p
2362
100n
F139
F141
+12Vstby
SLB_TV
SLB_VCR
YCVBSIN_AUX
RCIN_AUX
GIN_AUX
SLB_AUX
BC_AUX
F151
F153
F158
F160
F263
2416
100n
F162
F129
F132
F136
F146
F154
F156
F143
2417
100n
+8VSTBY
F261
BCTV
2363
F159
2365
2n
F161
YCVBSIN
2364
100u
2367
100n
F170
F172
F168
F173
F169
4304
4305
Y_ENC
LIN_AUX
RIN_AUX
BO
GO
RO
F176
F177
2372
4u7
2373
4u7
F181
F180
3338
10K
3339
100R
3340
100R
3341
10K
STEREO_R
STEREO_L
2
7304
LF80C
+12Vstby
10.8V
IN
OUT
GND
2354
220n
F120
3433
8V
F121
+8VAud
+8Vstby
2412
47u
+5V
3611
4K7
F268
0.7V
3613
2K7
7329
BC847B
+6V
3610
4K7
F265
F266
3612
10K
F267
0.7V
3614
10K
0V
DC_OFF
7330
BC847B
SLB_VCR
3999
7999
BC847B
PROCESS CHIPS
ELECTRONIC VOLTMETER
DC VOLTAGES MEASURED IN STOP MODE
CL 06532152_061.eps
121200

AV Board (Europe): Video out


1B
VIDEO OUT
1A
CVBS
CVBS-OUT
Y/C OUT
C_OUT Y_OUT
Y_OUT
C_OUT
TCS79
1402-A
YKC21-3930
TP19
TP20
TP21
1303
2
KILL
KILL_SCART
SLB_VCR
B/C SWITCHING
FBOUT_TV
BOUT_TV
COUT_AUX
FBIN_AUX
Vref
ELECTRONIC VOLTMETER
DC VOLTAGES MEASURED IN STOP MODE
TV-SCART
1304-1
AUX-SCART
1304-2
1304-3
MT1 MT2
0350608190
OPTION
1350
EH-B
TO SCART DATA FILTER PCB
ROUT_TV
RIN_TV
LOUT_TV
LIN_TV
BC_TV
GOUT_TV
RCOUT_TV
FBOUT_TV
YCVBSOUT_TV
YCVBSIN_TV
ROUT_AUX
RIN_AUX
LOUT_AUX
LIN_AUX
BC_AUX
SLB_AUX
GIN_AUX
RCIN_AUX
FBIN_AUX
YCVBSOUT_AUX
YCVBSIN_AUX
SLB_TV
P50
+8Vstby
+6Vstby
-8Vstby
CL 06532152_062.eps
121200

1303	D6	3602	F3
1304-1	A13	3603	F4
1304-2	F13	3604	F2
1304-3	E13	3605	F1
1350	A13	3606	F4
1402-A	B6	3607	F4
2308	D6	3608	H5
2314	C3	3609	D4
2337	D5	4301	C11
2353	A11	6300	C3
2355	A10	6301	H1
2357	A10	6305	B11
2358	A13	6306	B7
2359	B10	6307	C8
2366	C12	7300	B3
2368	C12	7301	B2
2369	C13	7302	C5
2371	D13	7303	D3
2375	E12	7306	B10
2376	E11	7307	C11
2377	B5	7308	D10
2378	E11	7309	D11
2382	F11	7310	B4
2383	F11	7311	H6
2385	F10	7312	H4
2395	G12	7313	I3
2396	H10	7314	I6
2399	H10	7315	I7
2402	H11	7320	F6
2404	H13	7321	F6
2408	I12	7324	G7
2409	I13	7325	I11
2410	I12	7326	F4
2411	I11	7327	F3
2413	C13	7328	F2
2414	H12	7336	A12
2418	D4	7337	B11
3300	A3	7417	C8
3301	B3	F100	B2
3302	B3	F101	B3
3303	D4	F102	B4
3304	B3	F103	B3
3305	B3	F104	B4
3306	D5	F107	B3
3307	C3	F108	B5
3308	C3	F111	C3
3309	C3	F114	A12
3310	D5	F115	A11
3312	D3	F127	A11
3313	B12	F133	B11
3314	A12	F134	A13
3315	A11	F137	A13
3316	A12	F140	B13
3318	A11	F145	B12
3319	A11	F148	B12
3320	A12	F149	B13
3323	B11	F152	B10
3325	B11	F155	C11
3327	C11	F157	C12
3329	C11	F163	C11
3330	C12	F164	C12
3332	D11	F165	C12
3333	D11	F166	D11
3335	D11	F167	D10
3336	E12	F171	D12
3342	E11	F174	D12
3343	D13	F175	D10
3345	B5	F178	E12
3347	B4	F183	E12
3348	E12	F184	C4
3349	F13	F186	D3
3351	F12	F187	D5
3354	H7	F189	D4
3355	H7	F190	D5
3356	H3	F192	D5
3357	H4	F193	E12
3359	F12	F194	F3
3360	H6	F195	F12
3362	H7	F197	F2
3363	F11	F198	F4
3364	I7	F199	F7
3365	I4	F205	F11
3366	F12	F207	F2
3367	A12	F208	F6
3368	A11	F209	F4
3378	I2	F210	F5
3394	F11	F212	F11
3395	I5	F216	G13
3397	G11	F218	G12
3398	I3	F219	G13
3399	I4	F220	G7
3402	I6	F222	G13
3407	H11	F229	H12
3408	H11	F232	H1
3409	G11	F234	H11
3410	F5	F235	H7
3411	F7	F236	H4
3413	H12	F239	H3
3416	F7	F240	H7
3417	F6	F241	H5
3421	H1	F245	I2
3422	F5	F246	I3
3423	G7	F247	I11
3425	I12	F248	I6
3427	G7	F252	I5
3429	I11	F253	I5
3431	I11	F254	I7
3432	I13	F255	I7
3434	B10	F256	I10
3435	C10	F257	I11
3436	D11	F258	I12
3437	D10	F259	I12
3438	D10	F264	D4
3439	C4	F297	F3
3440	D3	F299	F4
3441	I10	F300	G7
3515	C7	F481	B7
3600	E3	F482	B8
3601	F2	F483	C7

AV Board (Europe): Audio


2 AUDIO
FROM MONO PCB
7400 LD1117
7401 UDA1328T
DIGITAL INTERFACE
CONTROL INTERFACE
VOL/MUTE/DEEMPH
INTERPOL FILTER
NOISE SHAPER
DAC'S
7403-A MC33079
7403-B MC33079
7403-C MC33079
7403-D MC33079
7408-A MC33079
7408-B MC33079
7408-C MC33079
7408-D MC33079
7413-A HEF4053BT
7413-B HEF4053BT
7413-C HEF4053BT
7414-A LM833D
7414-B LM833D
NOT USED IN SACD1000
1400-A YKC21-4040
1400-B YKC21-4040
1400-C YKC21-4040
1402-B YKC21-3930
1402-C YKC21-3930
1405 YKC21-3416
1410 EH-B
TO HEADPHONE PCB
RIGHT FRONT
LEFT FRONT
SUBW
CENTER
RIGHT REAR
LEFT REAR
STEREO_L
STEREO_R
HP_L
HP_R
ST_L
ST_R
KILL
DIG_OUT
CENTER_ON
STEREO_MUTE
DIG_OUT
OPTIONAL
DRIVER
6400 GP1F32T
5400 7CHA
6308 RB501V-40
6309 BZX284-C5V1
7422 BC557B
7423 BC847B
7421 BC817-25
+8VAud
+12VAUD
-8Vstby
+6Vstby
+5Va
3V3
1.65V
2.8VRMS
5.5V
0.6V
0.7V
1 A
ELECTRONIC VOLTMETER
DC VOLTAGES MEASURED IN STOP MODE
KILL: -5V DURING PLAY
+5V DURING STOP, NEXT, PREVIOUS
CL 06532152_063.eps
121200

1300-10	E1
1300-11	E1
1300-12	E1
1300-13	E1
1300-14	F1
1300-15	F1
1300-16	F1
1300-17	F1
1300-18	G1
1300-19	G1
1300-20	G1
1300-21	G1
1300-22	G1
1300-4	D1
1300-7	E1
1301-1	H1
1301-11	I1
1301-12	I1
1301-3	H1
1301-4	H1
1301-5	H1
1301-6	I1
1301-7	I1
1400-A	A11
1400-B	D9
1400-C	G9
1402-B	D13
1402-C	D13
1405	I13
1410	A13
2450	B6
2452	A2
2453	A3
2455	B4
2456	B7
2457	C10
2458	C6
2459	A4
2460	B2
2461	C6
2462	A7
2463	A10
2464	A6
2465	D6
2466	D7
2467	D8
2468	E6
2469	E2
2470	D11
2471	E2
2472	E3
2473	D10
2474	D11
2475	F6
2476	E12
2477	E6
2478	F8
2479	E11
2480	F5
2481	G6
2482	G8
2483	F11
2484	G5
2485	H6
2486	H8
2487	H5
2488	H13
2489	I12
2490	D7
2491	I2
2493	I8
2494	I11
2495	I9
3442	B7
3444	C4
3445	C10
3446	C7
3447	C8
3448	C4
3451	C4
3452	B2
3453	C6
3454	A4
3455	A4
3456	A7
3457	A8
3458	C3
3459	B4
3460	C3
3461	A10
3462	A7
3463	A8
3464	A6
3466	D7
3468	D4
3469	D8
3470	E7
3471	E5
3472	E1
3473	E2
3475	E6
3476	E12
3477	E13
3478	E4
3479	F4
3480	F7
3481	F13
3482	F5
3483	F8
3484	F7
3486	G4
3487	G7
3488	G7
3489	G4
3490	G8
3491	F12
3492	F13
3493	G5
3494	G13
3495	H4
3496	H7
3497	H7
3498	H5
3499	H8
3502	H5
3505	I8
3506	F3
3507	I8
3508	I10
3509	G2
3510	C6
3511	C1
3512	C1
3513	F12
3514	G12
3516	H2
3517	B7
3518	B3
3519	B3
3520	I2
3521	I3
3522	I2
3523	H3
3524	H13
3525	F1
3527	G2
4400	F10
4401	E10
5400	I9
6308	H12
6309	H11
6400	I13
7400	A2
7401	B2
7402	A3
7403-A	A6
7403-B	B6
7403-C	A11
7403-D	C11
7404	C7
7405	C8
7406	A9
7407	A7
7408-A	E5
7408-B	D6
7408-C	G5
7408-D	F5
7409	E7
7410	F7
7411	G7
7412	H7
7413-A	D10
7413-B	F9
7413-C	G9
7414-A	E11
7414-B	F11
7415	E13
7416	G12
7419	F13
7420	G13
7421	G3
7422	I3
7423	I3
F400	A12
F401	A3
F403	A5
F404	A6
F405	A7
F406	A8
F408	A5
F409	A7
F410	A7
F411	A8
F412	B4
F413	C12
F414	B2
F415	B5
F416	B7
F417	B9
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F419	B1
F420	B7
F421	B6
F422	B1
F423	C7
F424	C8
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F432	C1
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F435	D7
F436	D8
F437	D3
F438	D7
F439	E2
F440	D10
F441	E6
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F443	E4
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F447	E13
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F449	E5
F450	F6
F451	F6
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F453	E12
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F457	F7
F458	F10
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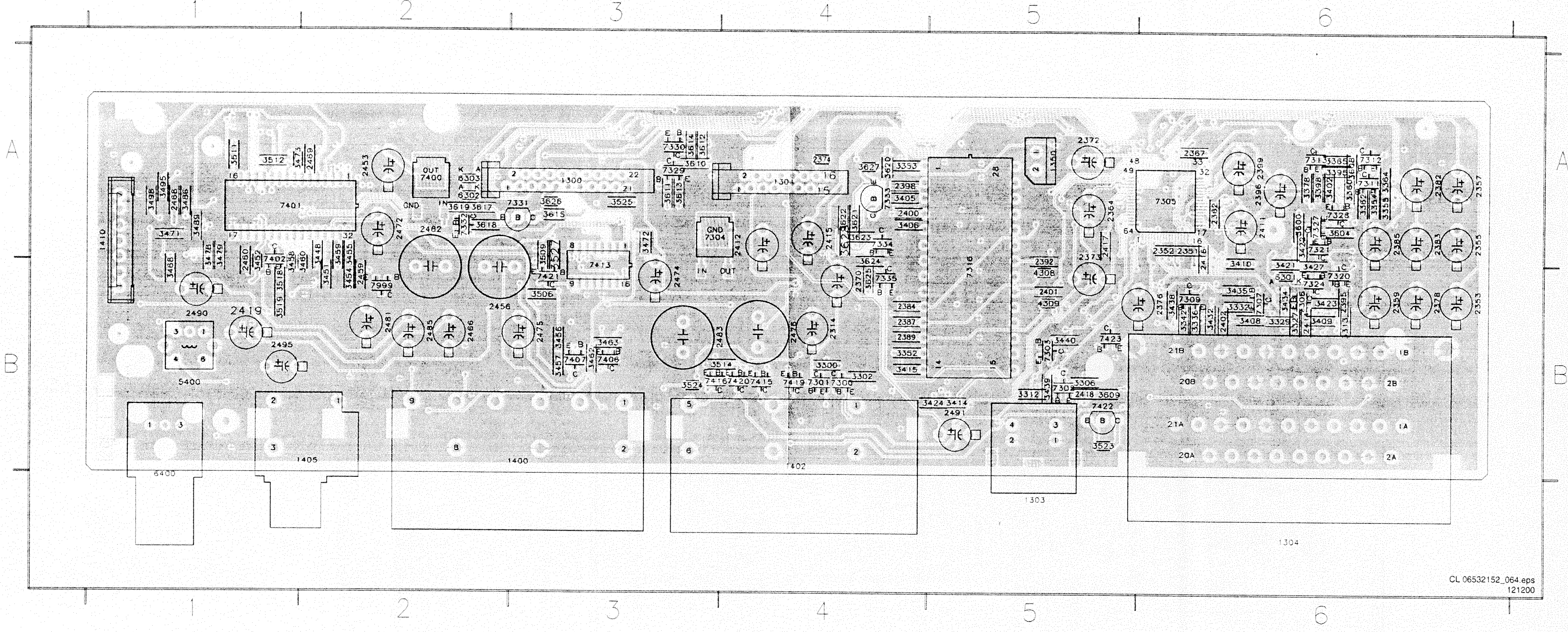
F462	F7
F463	G4
F464	G7
F465	F11
F466	F12
F467	F13
F468	F13
F469	G10
F470	G13
F471	G1
F472	G4
F473	G1
F474	H6
F475	H6
F476	H8
F477	H5
F478	G1
F479	H7
F480	G12
F485	I2
F486	I8
F487	I8
F488	I10
F489	I10
F490	I10
F491	G2
F497	H1
F498	G12
F499	A3
F500	H3
F501	I2
F502	I3
F503	I2
F600	I9
F601	E1

Layout AV Board (Europe) (top view)

1300	A3	2352	A6	2374	A4	2396	A6	2417	A5	2472	A2	3302	B4	3354	A6	3406	A4	3432	B6	3456	B3	3478	A1	3518	B1	3611	A3	3623	A4	6303	A2	7311	A6	7331	A3	7415	B4
1301	A4	2353	B6	2376	B5	2398	A4	2418	B5	2474	B3	3306	B5	3355	A6	3408	B6	3434	B6	3457	B3	3479	A1	3519	B1	3612	A3	3624	A4	6400	B1	7312	A6	7332	A2	7416	B3
1303	B5	2355	B6	2378	B6	2399	A6	2419	B1	2475	B2	3312	B5	3360	A6	3409	B6	3435	B6	3458	B1	3486	A1	3523	B5	3613	A3	3625	B4	7300	B4	7313	A6	7333	A4	7419	B4
1304	B6	2357	A6	2382	A6	2400	A4	2453	A2	2476	B4	3313	B6	3362	A6	3410	B6	3438	B6	3459	B2	3489	A1	3524	B3	3614	A3	3626	A3	7301	B4	7316	A5	7334	A4	7420	B4
1350	A5	2359	B6	2383	B6	2401	B5	2456	B3	2481	B2	3327	B6	3364	A6	3414	B5	3439	B5	3460	B1	3495	A1	3525	A3	3615	A3	3627	A4	7302	B5	7320	B6	7335	B4	7421	B3
1400	B2	2362	A6	2384	B4	2402	B6	2459	B2	2483	B3	3329	B6	3365	A6	3415	B4	3440	B5	3462	B3	3498	A1	3527	A3	3617	A2	3628	A4	7303	B5	7321	A6	7400	A2	7422	B5
1402	B4	2364	A5	2385	A6	2411	A6	2460	B1	2485	B2	3332	B6	3378	A6	3421	B6	3448	A2	3463	B3	3506	B3	3600	A6	3618	A2	4308	A5	7304	B5	7324	B6	7401	A1	7423	B5
1405	B2	2367	A6	2387	B4	2412	A4	2462	B2	2490	B1	3336	B6	3395	A6	3422	A6	3451	B2	3468	B1	3509	A3	3604	A6	3619	A2	4309	B5	7305	A6	7327	A6	7402	B1	7999	B2
1410	A1	2370	B4	2389	B4	2414	B6	2466	B2	2491	B5	3342	B6	3398	A6	3423	B6	3452	B1	3471	A1	3511	A1	3608	A6	3620	A4	5400	B1	7306	B6	7328	A6	7406	B3		
2314	B4	2372	A5	2392	A5	2415	A4	2468	A1	2495	B2	3352	B4	3402	A6	3424	B4	3454	B2	3472	A3	3512	A1	3609	B5	3621	A4	6301	B6	7307	B6	7329	A3	7407	B3		
2351	B6	2373	B5	2395	B6	2416	B6	2469	A1	3300	B4	3353	A4	3405	A4	3427	A6	3455	A2	3473	A1	3514	B4	3610	A3	3622	A4	6302	A2	7309	B6	7330	A3	7413	B3		



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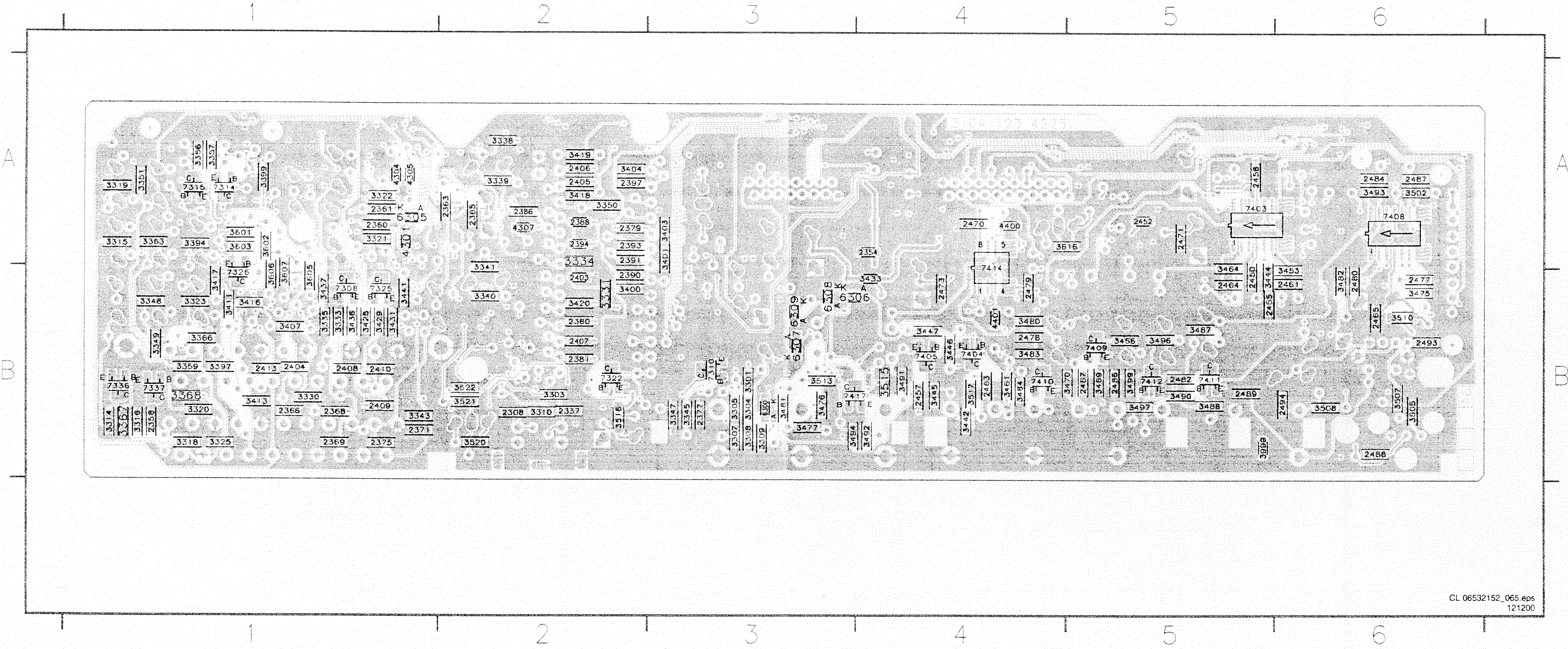
121200

Layout AV Board (Europe) (bottom view)

2308	B2	2371	B1	2394	A2	2450	B5	2471	A5	2489	B5	3314	B1	3331	B2	3348	B1	3394	A1
2337	B2	2375	B1	2397	A2	2452	A5	2473	B4	2493	B6	3315	A1	3333	B1	3349	B1	3397	B1
2354	A3	2377	B3	2403	B2	2455	B5	2477	A6	2494	B6	3316	B1	3334	B2	3350	A2	3399	A1
2358	B1	2379	A2	2404	B1	2457	B4	2478	B4	3301	B3	3318	B1	3335	B1	3351	A1	3400	B2
2360	A1	2380	B2	2405	A2	2458	A5	2479	B4	3303	B2	3319	A1	3338	A2	3356	A1	3401	A3
2361	A1	2381	B2	2406	A2	2461	B6	2480	A6	3304	B3	3320	B1	3339	A2	3357	A1	3403	A3
2363	A1	2386	A2	2407	B2	2463	B4	2482	B5	3305	B3	3321	A1	3340	B2	3359	B1	3404	A2
2365	A2	2388	A2	2408	B1	2464	B5	2484	A6	3307	B3	3322	A1	3341	B2	3363	A1	3407	B1
2366	B1	2390	B2	2409	B1	2465	B6	2486	B5	3308	B3	3323	B1	3343	B1	3366	B1	3411	B1
2368	B1	2391	A2	2410	B1	2467	B5	2487	A6	3309	B3	3325	B1	3345	B3	3367	B1	3413	B1
2369	B1	2393	A2	2413	B1	2470	A4	2488	B6	3310	B2	3330	B1	3347	B3	3368	B1	3416	B1

3417	B1	3442	B4	3475	B6	3491	B4	3510	B6	3605	A1	6300	B3	7325	B1	7412	B5
3418	A2	3444	A5	3476	B3	3492	B4	3513	B3	3606	B1	6305	A1	7326	B1	7414	A4
3419	A2	3445	B4	3477	B3	3493	A6	3515	B4	3607	A1	6306	B3	7336	B1	7417	B3
3420	B2	3446	B4	3480	B4	3494	B3	3516	B2	3616	A5	6307	B3	7337	B1		
3425	B1	3447	B4	3481	B3	3496	B5	3517	B4	3999	B6	6308	B3	7403	A5		
3429	B1	3453	A6	3482	A6	3497	B5	3520	B2	4301	A1	6309	B3	7404	B4		
3431	B1	3461	B4	3483	B4	3499	B5	3521	B2	4304	A1	7308	B1	7405	B4		
3433	B4	3464	B5	3484	B4	3502	A6	3522	B2	4305	A1	7310	B3	7408	A6		
3436	B1	3466	B5	3487	B5	3505	B6	3601	A1	4307	A2	7314	A1	7409	B5		
3437	A1	3469	B5	3488	B5	3507	B6	3602	A1	4400	A4	7315	A1	7410	B4		
3441	B1	3470	B4	3490	B5	3508	B6	3603	A1	4401	B4	7322	B2	7411	B5		



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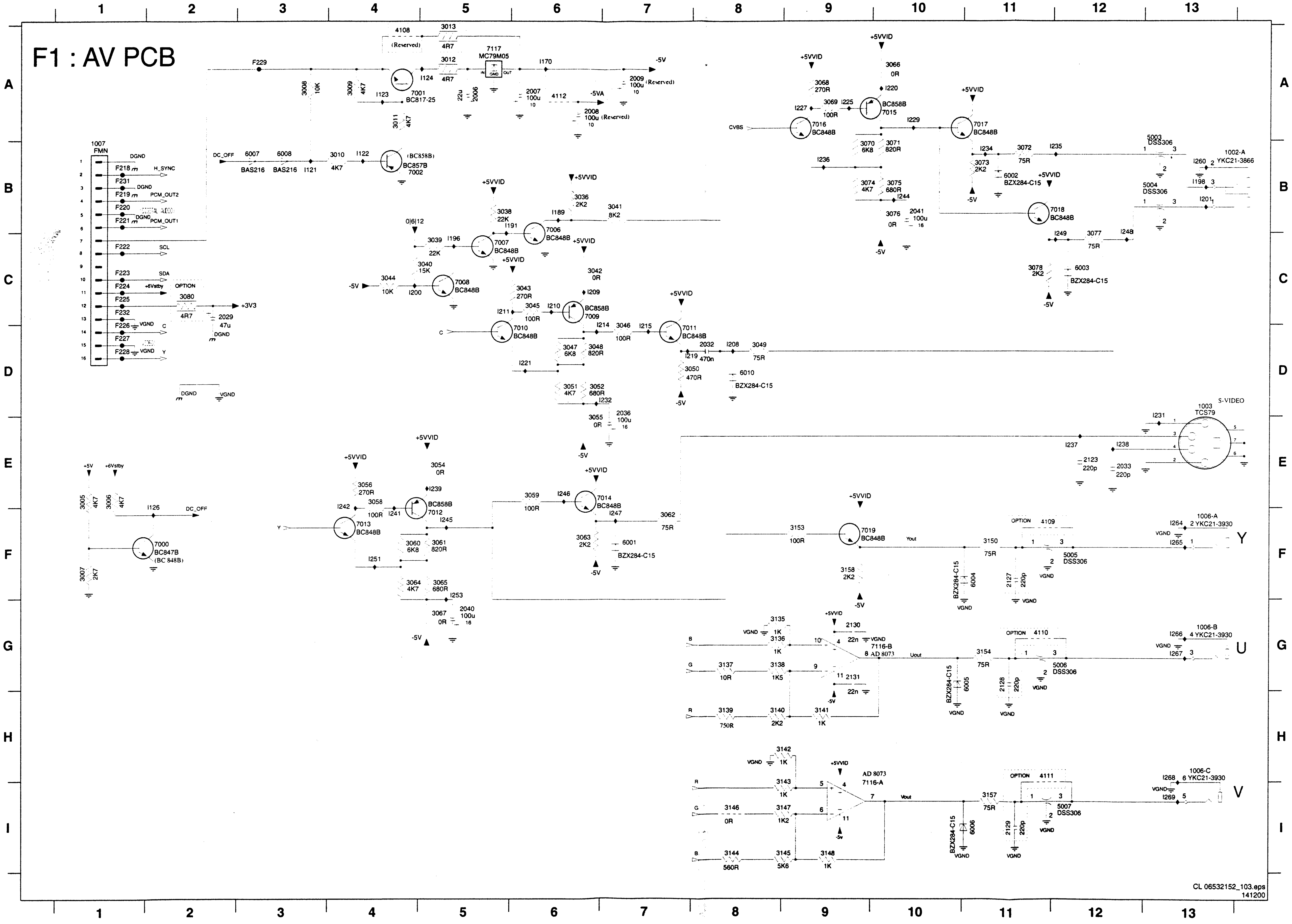
AV Board (US + AP): Video


F1 : AV PCB
1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
1007
FMN
DGND
F218
H_SYNC
F231
DGND
F219
PCM_OUT2
F220
DIGITAL AUDIO
F221
DGND
PCM_OUT1
F222
SCL
F223
SDA
F224
+6Vstby
OPTION
F225
3080
4R7
+3V3
F232
2029
47u
DGND
F226
VGND
C
F227
F228
VGND
Y
DGND
VGND
F229
3008
10K
3009
4K7
7001
BC817-25
I123
I124
3011
4K7
4108
(Reserved)
3013
4R7
3012
4R7
7117
MC79M05
IN
GND
OUT
22u
2006
2007
100u
10
I170
-5V
2009
100u
(Reserved)
4112
-5VA
2008
100u
(Reserved)
DC_OFF
6007
BAS216
6008
BAS216
I121
3010
4K7
I122
(BC858B)
BC857B
7002
+5VVID
3038
22K
I191
3036
2K2
3041
8K2
I189
7006
BC848B
0|6|12
3039
22K
I196
7007
BC848B
3040
15K
7008
BC848B
3044
10K
I200
-5V
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0R
3043
270R
I209
I211
3045
100R
I210
7009
BC858B
7010
BC848B
I214
3046
100R
I215
7011
BC848B
2032
470n
I208
3049
75R
I219
3050
470R
6010
BZX284-C15
3047
6K8
3048
820R
I221
3051
4K7
3052
680R
I232
3055
0R
2036
100u
16
+5V
+6Vstby
3005
4K7
3006
4K7
I126
DC_OFF
7000
BC847B
(BC 848B)
3007
2K7
3056
270R
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3058
100R
I242
I241
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7013
BC848B
I245
3060
6K8
3061
820R
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3064
4K7
3065
680R
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100u
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75R
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BZX284-C15
CVBS
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270R
3069
100R
I225
I227
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7015
BC858B
I229
7017
BC848B
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680R
I244
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100u
16
I234
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75R
I235
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2K2
6002
BZX284-C15
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BC848B
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3077
75R
I248
3078
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BZX284-C15
5003
DSS306
5004
DSS306
1002-A
YKC21-3866
I260
I198
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1003
TCS79
S-VIDEO
I231
I237
I238
2123
220p
2033
220p
3153
100R
7019
BC848B
Yout
3150
75R
OPTION
4109
5005
DSS306
6004
BZX284-C15
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3158
2K2
1006-A
2 YKC21-3930
I264
I265
Y
3135
1K
3136
1K
2130
22n
7116-B
AD 8073
Uout
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22n
3139
750R
3140
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3141
1K
3154
75R
OPTION
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5006
DSS306
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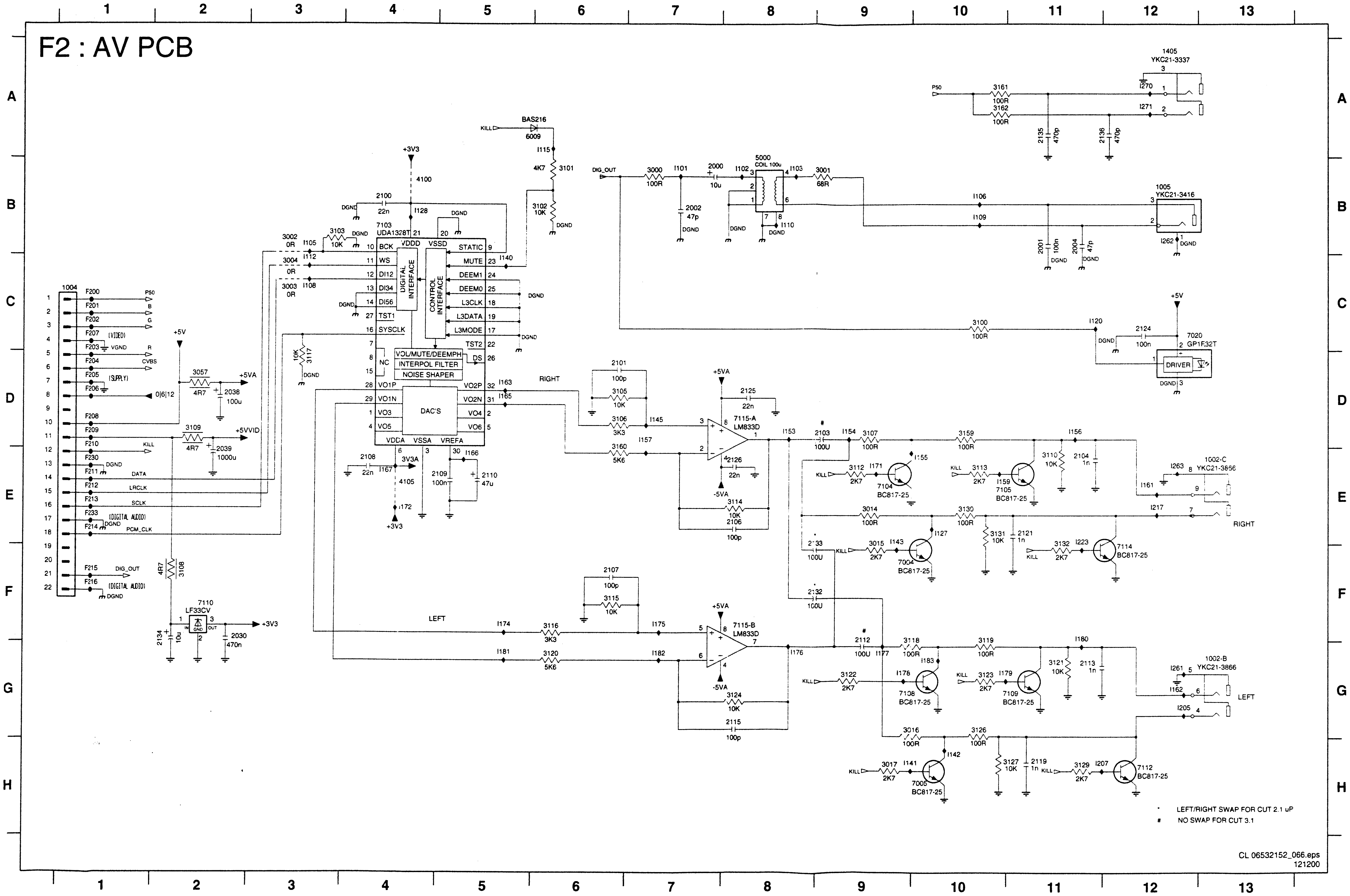
220p
1006-B
4 YKC21-3930
I266
I267
U
3142
1K
3143
1K
AD 8073
7116-A
Vout
3146
0R
3147
1K2
3144
560R
3145
5K6
3148
1K
3157
75R
OPTION
4111
5007
DSS306
6006
2129
220p
1006-C
6 YKC21-3930
I268
I269
V
R
G
B
CL 06532152_103.eps
141200

1002-A	B13
1003	D13
1006-A	F13
1006-B	G13
1006-C	H13
1007	B1
2006	A5
2007	A6
2008	A6
2009	A7
2029	C2
2032	D8
2033	E12
2036	D7
2040	G5
2041	B10
2123	E12
2127	F11
2128	G11
2129	I11
2130	G9
2131	G9
3005	E1
3006	E1
3007	F1
3008	A3
3009	A4
3010	B4
3011	A4
3012	A5
3013	A5
3036	B6
3038	B5
3039	C5
3040	C5
3041	B7
3042	C6
3043	C6
3044	C4
3045	C6
3046	D7
3047	D6
3048	D6
3049	D8
3050	D7
3051	D6
3052	D6
3054	E5
3055	E6
3056	E4
3058	E4
3059	E6
3060	F4
3061	F5
3062	F7
3063	F6
3064	F4
3065	F5
3066	A10
3067	G5
3068	A9
3069	A9
3070	B9
3071	B10
3072	B11
3073	B11
3074	B9
3075	B10
3076	B10
3077	C12
3078	C11
3080	C2
3135	G8
3136	G8
3137	G8
3138	G8
3139	H8
3140	H8
3141	H9
3142	H9
3143	I9
3144	I8
3145	I9
3146	I8
3147	I9
3148	I9
3150	F11
3153	F9
3154	G11
3157	I11
3158	F9
4108	A4
4109	F11
4110	G11
4111	H11
4112	A6
5003	A13
5004	B12
5005	F12
5006	G12
5007	I12
6001	F7
6002	B11
6003	C12
6004	F11
6005	G11
6006	I11
6007	B3
6008	B3
6010	D8
7000	F2
7001	A5
7002	B4
7006	B6
7007	C5
7008	C5
7009	C6
7010	D6
7011	D7
7012	F5
7013	F4
7014	E6
7015	A10
7016	A9
7017	A11
7018	B11
7019	F9
7116-A	I9
7116-B	G10
7117	A5
F218	B1
F219	B1
F220	B1
F221	B1
F222	C1
F223	C1
F224	C1
F225	C1
F226	D1
F227	D1
F228	D1
F229	A3
F231	B1
F232	C1
I121	B3
I122	B4
I123	A4
I124	A5
I126	E2
I170	A6
I189	B6
I191	B6
I196	C5
I198	B13
I200	C4
I201	B13
I208	D8
I209	C6
I210	C6
I211	C5
I214	D7
I215	D7
I219	D7
I220	A10
I221	D6
I225	A9
I227	A9
I229	A10
I231	D13
I232	D7
I234	B11
I235	B12
I236	B9
I237	E12
I238	E12
I239	E5
I241	F4
I242	E4
I244	B10
I245	F5
I246	E6
I247	F7
I248	B12
I249	C12
I251	F4
I253	F5
I260	B13
I264	F13
I265	F13
I266	G13
I267	G13
I268	H13
I269	I13

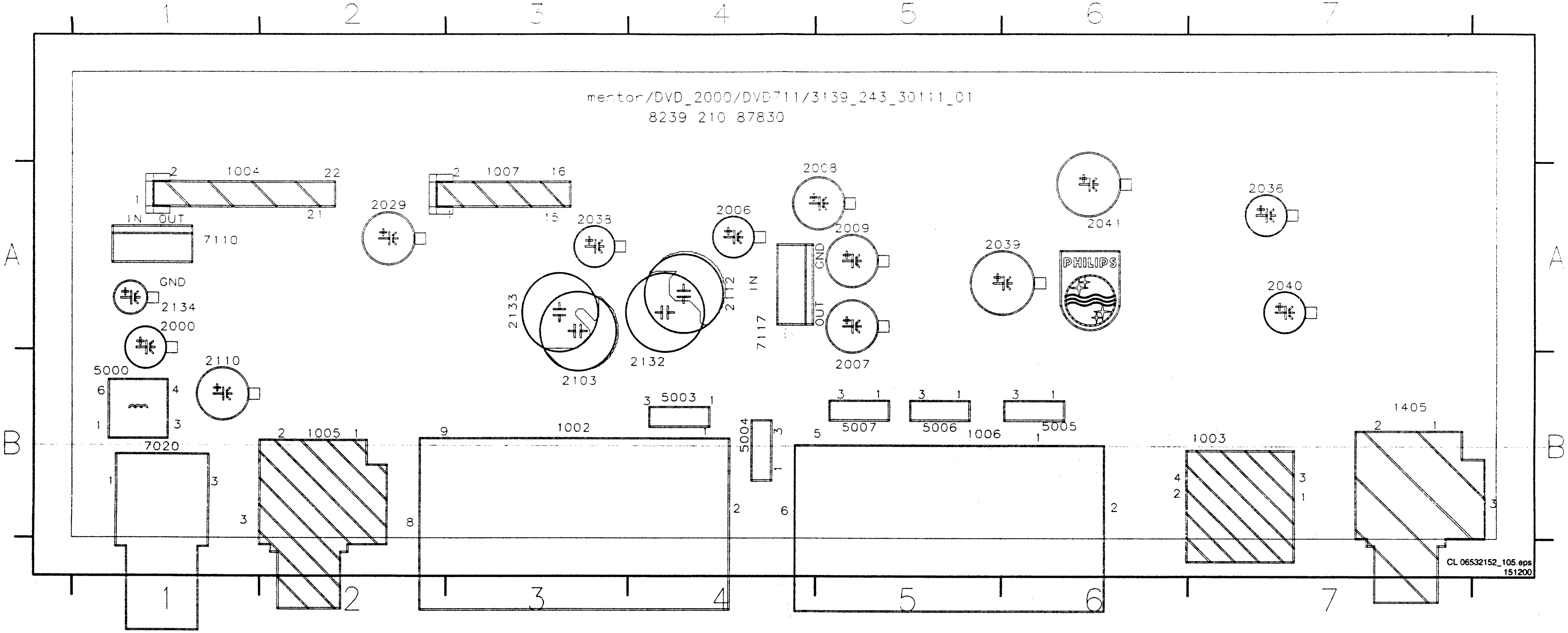
AV Board (US + AP): Audio


F2 : AV PCB
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H
1004
F200 P50
F201 B
F202 G
F207 (VIDEO)
F203 VGND R
F204 CVBS
F205 (SUPPLY)
F206 0|6|12
F208
F209
F210 KILL
F230
F211 DGND DATA
F212 LRCLK
F213 SCLK
F233 (DIGITAL AUDIO)
F214 DGND PCM_CLK
F215 DIG_OUT
F216 (DIGITAL AUDIO) DGND
+5V
3057 4R7 +5VA
2038 100u
3109 4R7 +5VVID
2039 1000u
3108 4R7
7110 LF33CV GND OUT +3V3
2134 10u
2030 470n
3002 0R I105
3004 0R I112
3003 0R I108
3103 10K DGND
2100 22n
+3V3 4100 I128
7103 UDA1328T
BCK WS DI12 DI34 DI56 TST1 SYSCLK NC
DIGITAL INTERFACE
CONTROL INTERFACE
VDDD VSSD STATIC MUTE DEEM1 DEEM0 L3CLK L3DATA L3MODE TST2 DS
VOL/MUTE/DEEMPH
INTERPOL FILTER
NOISE SHAPER
DAC'S
VO1P VO1N VO3 VO5 VO2P VO2N VO4 VO6
VDDA VSSA VREFA
3117 10K DGND
2108 22n I167 3V3A 4105 I172 +3V3
2109 100n I166 2110 47u
KILL BAS216 6009 I115
3101 4K7
3102 10K DGND
I140 I163 I165
RIGHT
2101 100p
3105 10K
3106 3K3 I145
3160 5K6 I157
+5VA
7115-A LM833D
-5VA
2125 22n
2126 22n
3114 10K
2106 100p
I153 2103 100U I154 3107 100R 3159 100R I156
3112 2K7 I171 7104 BC817-25 I155
3113 2K7 I159 7105 BC817-25
3110 10K 2104 1n
3014 100R 3130 100R
2133 100U 3015 2K7 I143 7004 BC817-25 I127
3131 10K 2121 1n
3132 2K7 I223 7114 BC817-25
2132 100U
LEFT
2107 100p
3115 10K
I174 3116 3K3 I175
I181 3120 5K6 I182
7115-B LM833D
3124 10K
2115 100p
I176 2112 100U I177 3118 100R 3119 100R I180
3122 2K7 I178 7108 BC817-25 I183
3123 2K7 I179 7109 BC817-25
3121 10K 2113 1n
3016 100R 3126 100R
3017 2K7 I141 7005 BC817-25 I142
3127 10K 2119 1n
3129 2K7 I207 7112 BC817-25
DIG_OUT 3000 100R I101 2000 10u I102 5000 COIL 100u I103 3001 68R
2002 47p DGND
I110 DGND
I106 I109
2001 100n 2004 47p DGND
1005 YKC21-3416 I262 DGND
3100 100R I120
2124 100n
+5V 7020 GP1F32T DRIVER DGND
P50 3161 100R 3162 100R
1405 YKC21-3337 I270 I271
2135 470p 2136 470p
1002-C YKC21-3866 I263 I161 I217 RIGHT
1002-B YKC21-3866 I261 I162 I205 LEFT
* LEFT/RIGHT SWAP FOR CUT 2.1 uP
# NO SWAP FOR CUT 3.1
CL 06532152_066.eps
121200

1002-B	G13
1002-C	E13
1004	C1
1005	B12
1405	A12
2000	B7
2001	B11
2002	B7
2004	B11
2030	F2
2038	D2
2039	E2
2100	B4
2101	D6
2103	D9
2104	E11
2106	E8
2107	F6
2108	E4
2109	E5
2110	E5
2112	G9
2113	G11
2115	G8
2119	H11
2121	E11
2124	C12
2125	D8
2126	E8
2132	F8
2133	F8
2134	F2
2135	A11
2136	A12
3000	B7
3001	B9
3002	B3
3003	C3
3004	C3
3014	E9
3015	F9
3016	G9
3017	H9
3057	D2
3100	C10
3101	B6
3102	B6
3103	B3
3105	D6
3106	D6
3107	D9
3108	F2
3109	D2
3110	E11
3112	E9
3113	E10
3114	E8
3115	F6
3116	F6
3117	D3
3118	G9
3119	G10
3120	G6
3121	G11
3122	G9
3123	G10
3124	G8
3126	G10
3127	H11
3129	H11
3130	E10
3131	E10
3132	F11
3159	D10
3160	E6
3161	A10
3162	A10
4100	B4
4105	E4
5000	B8
6009	A5
7004	F9
7005	H10
7020	C12
7103	B4
7104	E9
7105	E10
7108	G9
7109	G10
7110	F2
7112	H12
7114	F12
7115-A	D8
7115-B	F8
F200	C1
F201	C1
F202	C1
F203	C1
F204	D1
F205	D1
F206	D1
F207	C1
F208	D1
F209	D1
F210	D1
F211	E1
F212	E1
F213	E1
F214	E1
F215	F1
F216	F1
F230	E1
F233	E1
I101	B7
I102	B8
I103	B8
I105	B3
I106	B10
I108	C3
I109	B10
I110	B8
I112	C3
I115	A6
I120	C11
I127	E10
I128	B4
I140	C5
I141	H9
I142	H10
I143	E9
I145	D7
I153	D8
I154	D9
I155	E10
I156	D11
I157	D7
I159	E10
I161	E12
I162	G12
I163	D5
I165	D5
I166	E5
I167	E4
I171	E9
I172	E4
I174	F5
I175	F7
I176	G8
I177	G9
I178	G9
I179	G10
I180	F11
I181	G5
I182	G7
I183	G10
I205	G12
I207	H11
I217	E12
I223	E11
I261	G12
I262	B12
I263	E12
I270	A12
I271	A12

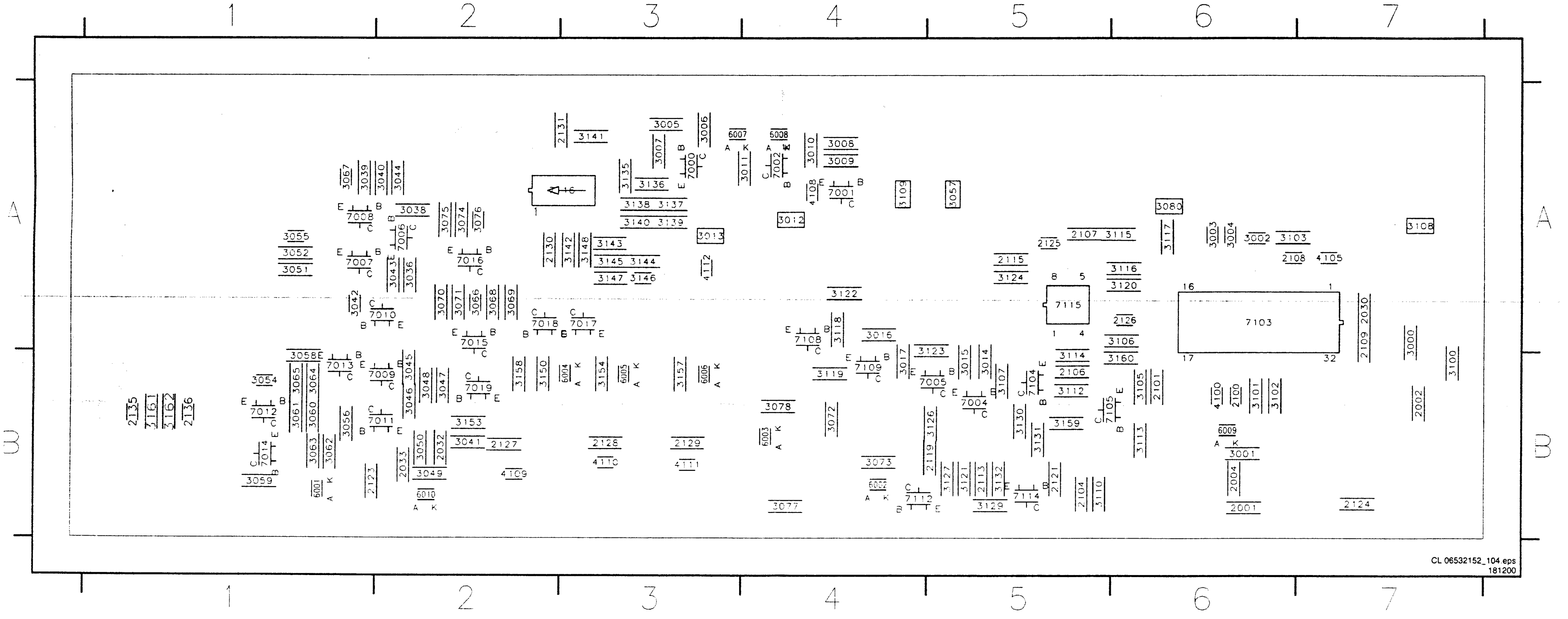
Layout AV Board (US + AP) (top view)

1002	B3
1003	B7
1004	A1
1005	B2
1006	B5
1007	A3
1405	B7
2000	A1
2006	A4
2007	B5
2008	A5
2009	A5
2029	A2
2036	A7
2038	A3
2039	A6
2040	A7
2041	A6
2103	B3
2110	B1
2112	A4
2132	B4
2133	A3
2134	A1
5000	B1
5003	B4
5004	B4
5005	B6
5006	B5
5007	B5
7020	B1
7110	A1
7117	A4


1
2
3
4
5
6
7
A
B
mentor/DVD_2000/DVD711/3139_243_30111_01
8239 210 87830
1004
2
22
1
21
1007
2
16
15
IN
OUT
7110
2029
2038
2006
2008
2041
2036
2009
2039
PHILIPS
GND
2134
2000
2133
2103
2132
2112
IN
GND
OUT
7117
2007
2040
2110
5000
6
4
1
3
7020
1
3
1005
2
1
3
1002
9
8
2
5003
3
1
5004
3
1
5007
5006
5005
1006
5
6
2
1003
4
2
3
1
1405
2
1
3
CL 06532152_105.eps
151200

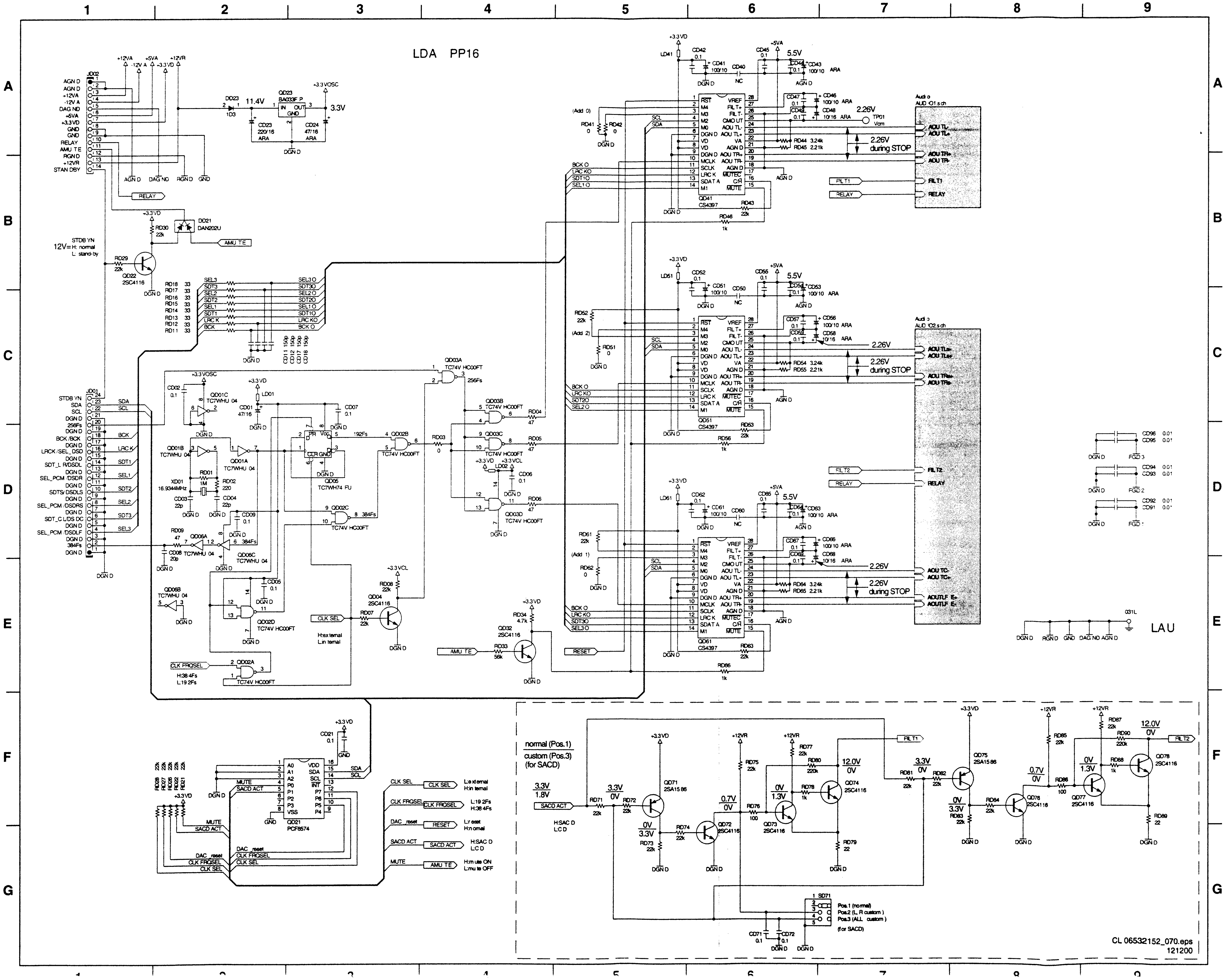
Layout AV Board (US + AP) (bottom view)

2001	B6	2113	B5	2135	B1	3011	A4	3043	A2	3057	A5	3070	A2	3103	A6	3118	A4	3135	A3	3148	A3	4109	B2	6010	B2	7013	B1	7114	B5
2002	B7	2115	A5	2136	B1	3012	A4	3044	A2	3058	B1	3071	A2	3105	B6	3119	B4	3136	A3	3150	B2	4110	B3	7000	A3	7014	B1	7115	A5
2004	B6	2119	B5	3000	A7	3013	A3	3045	B2	3059	B1	3072	B4	3106	A6	3120	A6	3137	A3	3153	B2	4111	B3	7001	A4	7015	A2	7116	A
2030	A7	2121	B5	3001	B6	3014	B5	3046	B2	3060	B1	3073	B4	3107	B5	3121	B5	3138	A3	3154	B3	4112	A3	7002	A4	7016	A2		
2032	B2	2123	B1	3002	A6	3015	B5	3047	B2	3061	B1	3074	A2	3108	A7	3122	A4	3139	A3	3157	B3	6001	B1	7004	B5	7017	A3		
2033	B2	2124	B7	3003	A6	3016	A4	3048	B2	3062	B1	3075	A2	3109	A4	3123	A5	3140	A3	3158	B2	6002	B4	7005	B5	7018	A2		
2100	B6	2125	A5	3004	A6	3017	B4	3049	B2	3063	B1	3076	A2	3110	B5	3124	A5	3141	A3	3159	B5	6003	B4	7006	A2	7019	B2		
2101	B6	2126	A6	3005	A3	3036	A2	3050	B2	3064	B1	3077	B4	3112	B5	3126	B5	3142	A3	3160	B6	6004	B3	7007	A1	7103	A6		
2104	B5	2127	B2	3006	A3	3038	A2	3051	A1	3065	B1	3078	B4	3113	B6	3127	B5	3143	A3	3161	B1	6005	B3	7008	A1	7104	B5		
2106	B5	2128	B3	3007	A3	3039	A1	3052	A1	3066	A2	3080	A6	3114	B5	3129	B5	3144	A3	3162	B1	6006	B3	7009	B2	7105	B5		
2107	A5	2129	B3	3008	A4	3040	A2	3054	B1	3067	A1	3100	B7	3115	A6	3130	B5	3145	A3	4100	B6	6007	A3	7010	A2	7108	A4		
2108	A6	2130	A2	3009	A4	3041	B2	3055	A1	3068	A2	3101	B6	3116	A6	3131	B5	3146	A3	4105	A7	6008	A4	7011	B2	7109	B4		
2109	A7	2131	A3	3010	A4	3042	A1	3056	B1	3069	A2	3102	B6	3117	A6	3132	B5	3147	A3	4108	A4	6009	B6	7012	B1	7112	B4		



CL 06532152_104.eps
181200

DAC-L2N


DAC-L2N
LDA PP16
LAU
CS4397
TC74V HC00FT
TC7WHU 04
TC7WH74 FU
PCF8574
BA033F P
DAN202U
2SC4116
2SA1586
16.9344MHz
11.4V
3.3V
5.5V
2.26V
2.26V during STOP
12.0V
0V
3.3V
1.8V
0.7V
1.3V
normal (Pos.1)
custom (Pos.3)
(for SACD)
Pos.1 (normal)
Pos.2 (L R custom)
Pos.3 (ALL custom)
(for SACD)
H:SAC D
L:CD
H:external
L:internal
H:384Fs
L:192Fs
H:mute ON
L:mute OFF
12V=H: normal
L: stand-by
STDB YN
AMU TE
RELAY
RESET
CLK SEL
CLK FRQSEL
DAC reset
SACD ACT
MUTE
FILT1
FILT2
SEL3
SDT3
SEL2
SDT2
SEL1
SDT1
LRCK
BCK
SDA
SCL
CL 06532152_070.eps
121200

CD01	C2
CD02	C2
CD03	D2
CD04	D2
CD05	E2
CD06	D4
CD07	C3
CD08	D2
CD09	D2
CD11	C2
CD12	C2
CD17	C2
CD18	C2
CD21	F3
CD23	A2
CD24	A3
CD40	A6
CD41	A6
CD42	A6
CD43	A6
CD44	A6
CD45	A6
CD46	A6
CD47	A6
CD48	A6
CD49	A6
CD50	C6
CD51	C6
CD52	C6
CD53	C6
CD54	C6
CD55	C6
CD56	C6
CD57	C6
CD58	C6
CD59	C6
CD60	D6
CD61	D6
CD62	D6
CD63	D6
CD64	D6
CD65	D6
CD66	D6
CD67	D6
CD68	D6
CD69	D6
CD71	G6
CD72	G6
CD91	D9
CD92	D9
CD93	D9
CD94	D9
CD95	D9
CD96	D9
DD21	B2
DD23	A2
JD01	C1
JD02	A1
LD01	C2
LD02	D4
LD41	A5
LD51	B5
LD61	D5
QD01A	D2
QD01B	D2
QD01C	C2
QD02A	E2
QD02B	D3
QD02C	D3
QD02D	E2
QD03A	C4
QD03B	C4
QD03C	D4
QD03D	D4
QD04	E3
QD05	D3
QD06A	D2
QD06B	E2
QD06C	D2
QD21	F3
QD22	B1
QD23	A2
QD32	E4
QD41	B6
QD51	C6
QD61	E6
QD71	F5
QD72	G6
QD73	F6
QD74	F7
QD75	F8
QD76	F8
QD77	F9
QD78	F9
RD01	D2
RD02	D2
RD03	D4
RD04	C4
RD05	D4
RD06	D4
RD07	E3
RD08	E3
RD09	D2
RD11	C2
RD12	C2
RD13	C2
RD14	C2
RD15	C2
RD16	C2
RD17	C2
RD18	B2
RD21	F2
RD22	F2
RD26	F2
RD27	F2
RD28	F2
RD29	B1
RD30	B1
RD33	E4
RD34	E4
RD41	A5
RD42	A5
RD43	B6
RD44	A6
RD45	A6
RD46	B6
RD51	C5
RD52	C5
RD53	D6
RD54	C6
RD55	C6
RD56	D6
RD61	D5
RD62	E5
RD63	E6
RD64	E6
RD65	E6
RD66	E6
RD71	F5
RD72	F5
RD73	G5
RD74	G5
RD75	F6
RD76	F6
RD77	F6
RD78	F6
RD79	G7
RD80	F6
RD81	F7
RD82	F7
RD83	F8
RD84	F8
RD85	F8
RD86	F8
RD87	F9
RD88	F9
RD89	F9
RD90	F9
SD71	G7
XD01	D2
031L	E9

Audio1-L2N

AUDIO1-L2N

C101	B5
C102	B5
C103	B5
C104	C7
C105	B6
C111	B8
C112	C8
C151	E5
C152	E5
C153	E5
C154	E7
C155	E6
C161	D8
C162	E8
C301	B2
C302	B4
C303	C3
C317	B1
C318	B2
C321	B5
C322	C5
C351	E2
C352	D4
C353	E3
C367	E1
C368	E2
C371	D5
C372	E5
C601	C9
C602	C9
C603	C9
C611	D9
C612	D9
C613	D9
DN31	C9
D101	B6
D102	B7
D103	C7
D151	E6
D152	D7
D153	E7
D301	B3
D302	B3
D303	C3
D351	E3
D352	D3
D353	E3
D601	C8
J601	C10
J611	D10
LN31	C9
L601	C9
L602	C8
L611	D9
Q101	B6
Q102	C6
Q103	B6
Q104	B7
Q105	B7
Q106	B8
Q107	B8
Q151	D6
Q152	E6
Q153	D6
Q154	D7
Q155	E7
Q156	D8
Q157	E8
Q301	B2
Q302	C2
Q303	B3
Q304	B4
Q305	B4
Q306	B4
Q307	C4
Q351	D2
Q352	E2
Q353	D3
Q354	D4
Q355	E4
Q356	D4
Q357	E4
R101	B5
R102	B5
R103	B5
R104	B6
R105	B6
R106	C6
R107	B7
R108	B7
R109	B7
R110	C6
R111	C7
R112	C7
R113	B8
R114	B8
R151	D5
R152	D5
R153	D5
R154	D6
R155	D6
R156	E6
R157	D7
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R309	B3
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R316	B1
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R363	D4
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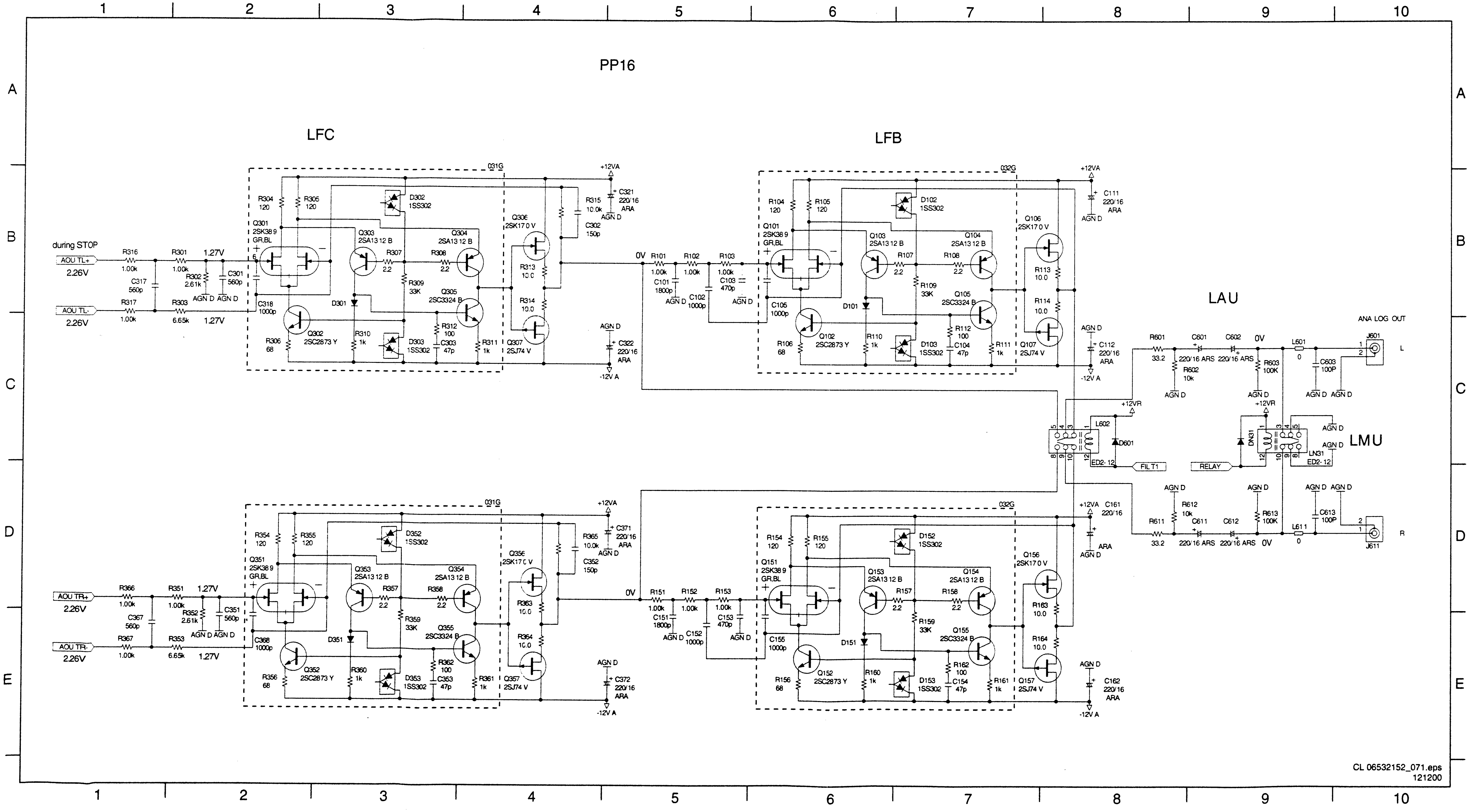
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LMU
031G
032G
during STOP
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2.26V
AOU TL-
2.26V
R316
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R317
1.00k
C317
560p
R301
1.00k
R303
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1.27V
1.27V
R302
2.61k
C301
560p
AGN D
AGN D
R304
120
R305
120
Q301
2SK38 9
GR,BL
6
C318
1000p
Q302
2SC2873 Y
R306
68
Q303
2SA13 12 B
R307
2.2
D301
R309
33K
R310
1k
D302
1SS302
D303
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Q304
2SA13 12 B
R308
2.2
Q305
2SC3324 B
R312
100
C303
47p
R311
1k
Q306
2SK17 0 V
Q307
2SJ74 V
R313
10.0
R314
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R315
10.0k
C302
150p
+12VA
C321
220/16
ARA
C322
220/16
ARA
-12V A
0V
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C101
1800p
R102
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C102
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470p
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GR,BL
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D102
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Q107
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10.0
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ARA
C112
220/16
ARA
ANA LOG OUT
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33.2
R602
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C601
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C602
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0
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J601
L
+12VR
L602
D601
ED2- 12
FIL T1
RELAY
DN31
LN31
ED2- 12
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33.2
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C611
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100K
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0
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R
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2.26V
AOU TR-
2.26V
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1.00k
R367
1.00k
C367
560p
R351
1.00k
R353
6.65k
1.27V
1.27V
R352
2.61k
C351
560p
R354
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R355
120
Q351
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GR,BL
C368
1000p
Q352
2SC2873 Y
R356
68
Q353
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R357
2.2
D351
R359
33K
R360
1k
D352
1SS302
D353
1SS302
Q354
2SA13 12 B
R358
2.2
Q355
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100
C353
47p
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Q357
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C372
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1800p
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GR,BL
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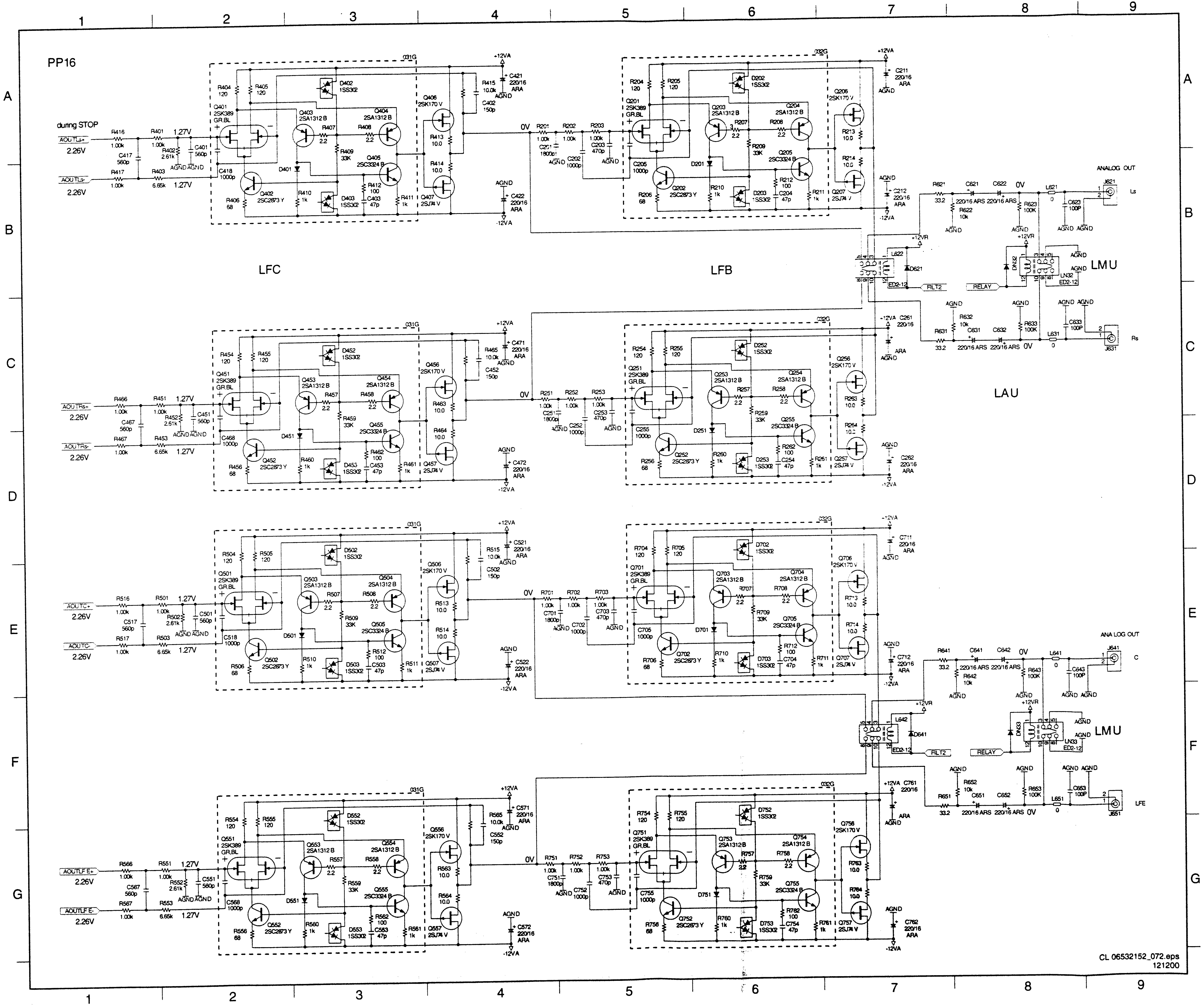
Audio2-L2N

AUDIO2-L2N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2.26V
1.27V
0V
+12VA
-12VA
AGND
LFC
LFB
LAU
LMU
ANALOG OUT
Ls
Rs
C
LFE
RELAY
FILT2
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220/16 ARA
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121200
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A
B
C
D
E
F
G

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C204	B6
C205	A5
C211	A7
C212	B7
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C252	C5
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C254	D6
C255	C5
C261	C7
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C452	C4
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C472	D4
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C521	D4
C522	E4
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L621	B8
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L631	C8
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L642	F7
L651	F8
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Q204	A6
Q205	B6
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Q207	B7
Q251	C5
Q252	D5
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Q254	C6
Q255	D6
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Q402	B2
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Q405	B3
Q406	A4
Q407	B4
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Q456	C4
Q457	D4
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R204	A5
R205	A5
R206	B5
R207	A6
R208	A6
R209	A6
R210	B6
R211	B6
R212	B6
R213	A7
R214	B7
R251	C4
R252	C5
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R254	C5
R255	C5
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R754	F5
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R756	G5
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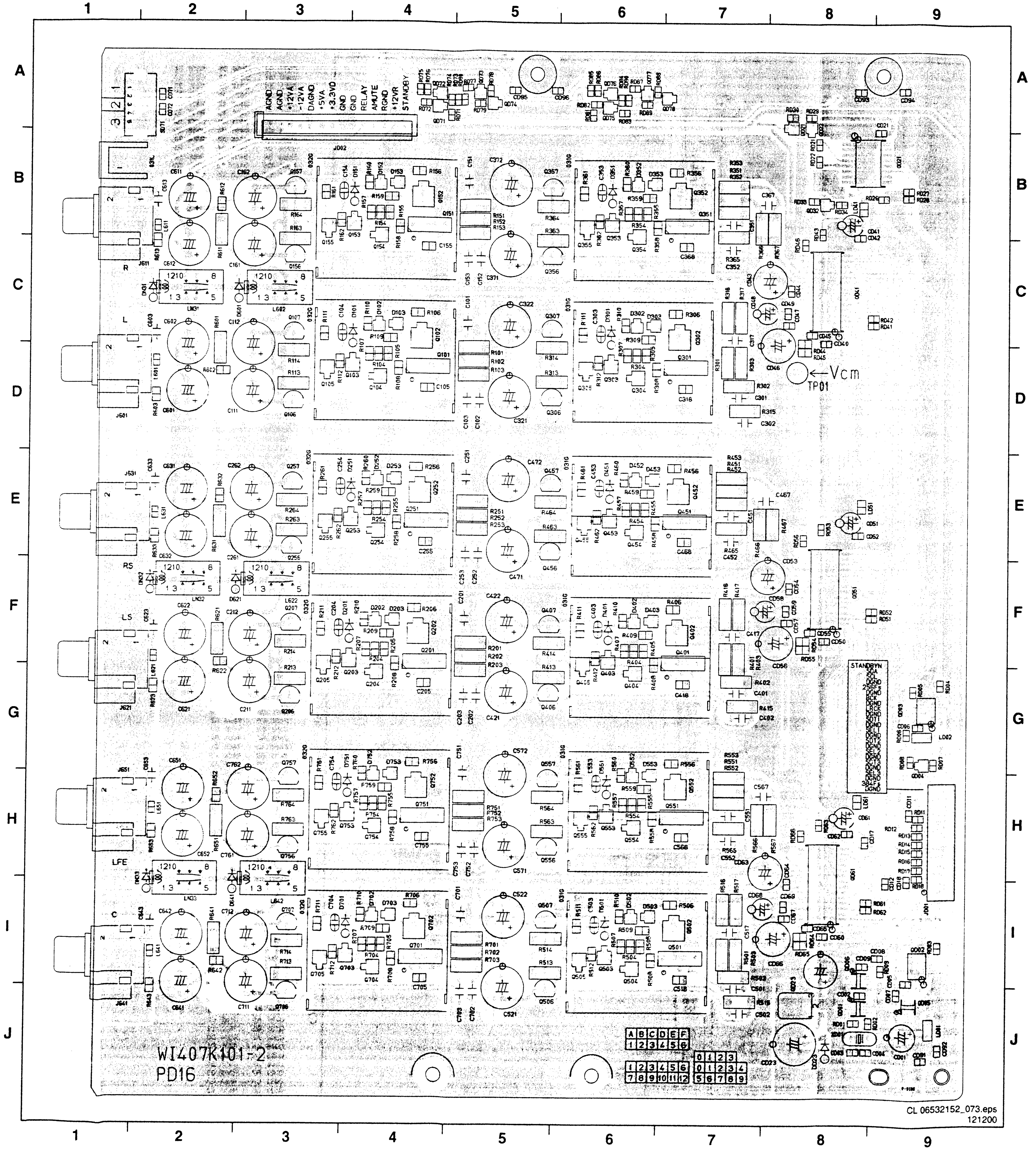
Layout DAC board (top view)



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CD07	J9
CD08	I9
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CD11	I9
CD12	I9
CD17	H8
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CD23	J8
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CD43	C7
CD44	C8
CD45	C8
CD46	D8
CD47	C8
CD48	C7
CD49	C8
CD50	F8
CD51	E8
CD52	E8
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CD55	F8
CD56	F8
CD57	F8
CD58	F8
CD59	F8
CD60	I8
CD61	H8
CD62	H8
CD63	H7
CD64	H8
CD65	I8
CD66	I8
CD67	I8
CD68	I7
CD69	I8
CD71	A2
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CD92	J9
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C503	I6
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C633	E2
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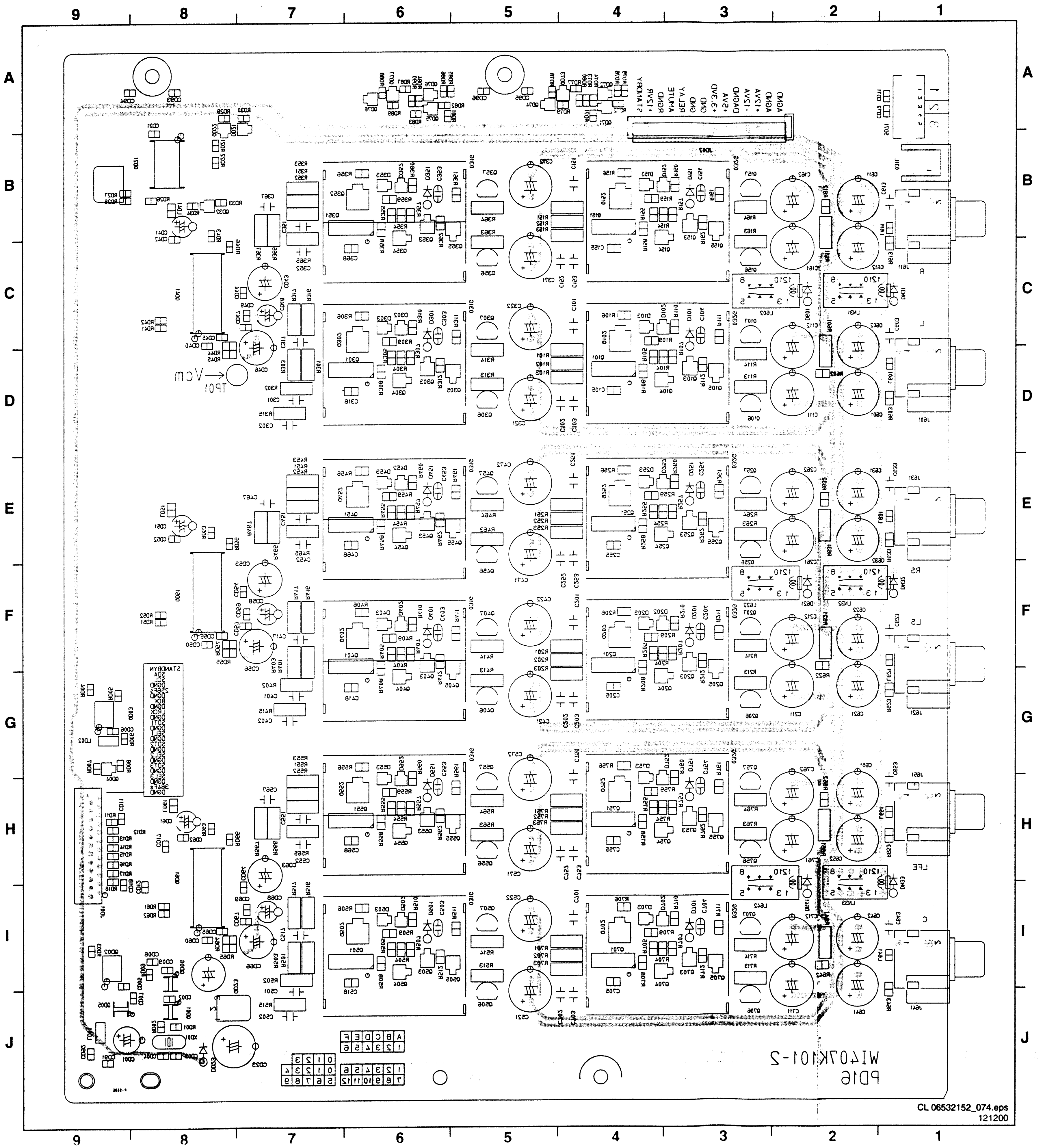
R415	G7
R416	F7
R417	F7
R451	E7
R452	E7
R453	E7
R454	E6
R455	E6
R456	E7
R457	E6
R458	E6
R459	E6
R460	E6
R461	E6
R462	E6
R463	E5
R464	E5
R465	E7
R466	E7
R467	E8
R501	I7
R502	I7
R503	I7
R504	I6
R505	I6
R506	I7
R507	I6
R508	I6
R509	I6
R510	I6
R511	I6
R512	I6
R513	I5
R514	I5
R515	J7
R516	I7
R517	I7
R551	H7
R552	H7
R553	H7
R554	H6
R555	H6
R556	G7
R557	H6
R558	H6
R559	H6
R560	G6
R561	H6
R562	H6
R563	H5
R564	H5
R565	H7
R566	H7
R567	H8
R601	C2
R602	D2
R603	D2
R611	C2
R612	B2
R613	C2
R621	F2
R622	F2
R623	G2
R631	E2
R632	E2
R633	E2
R641	I2
R642	I2
R643	J2
R651	H2
R652	H2
R653	H2
R701	I5
R702	I5
R703	I5
R704	I4
R705	I4
R706	I4
R707	I4
R708	I4
R709	I4
R710	I4
R711	I3
R712	I3
R713	I3
R714	I3
R751	H5
R752	H5
R753	H5
R754	H4
R755	H4
R756	G4
R757	H4
R758	H4
R759	H4
R760	G4
R761	H3
R762	H3
R763	H3
R764	H3
SD71	A2
XD01	J8
031L	B2

Layout DAC board (Bottom view)



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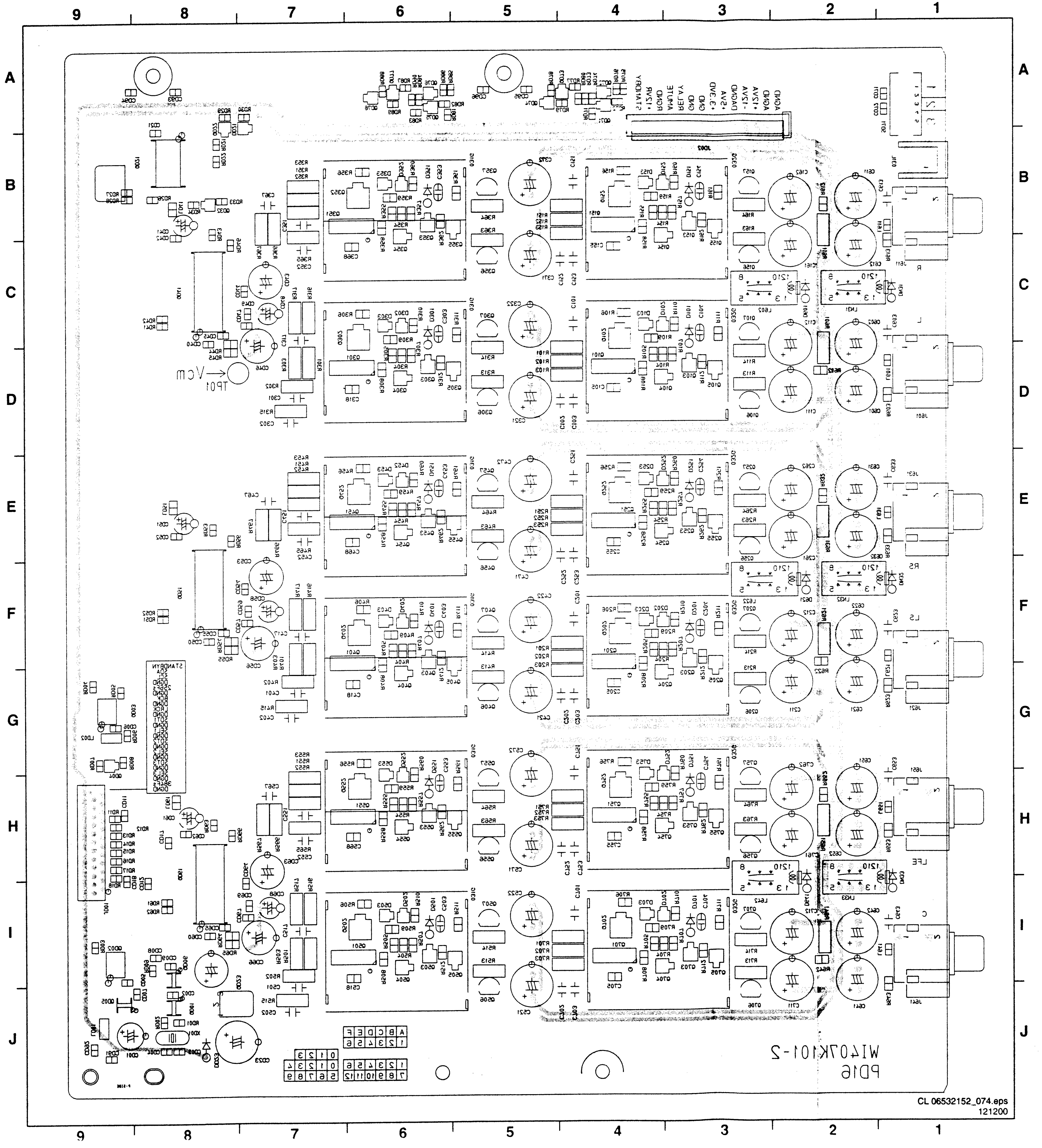
CD01	J9	C601	D2	Q103	D4	RD65	I8	R413	F5
CD02	J8	C602	C2	Q104	D4	RD66	H8	R414	F5
CD03	J8	C603	C2	Q105	D3	RD71	A4	R415	G7
CD04	J9	C611	B2	Q106	D3	RD72	A4	R416	F7
CD05	I9	C612	C2	Q107	C3	RD73	A4	R417	F7
CD06	G9	C613	B2	Q151	B4	RD74	A4	R451	E7
CD07	J9	C621	G2	Q152	B4	RD75	A4	R452	E7
CD08	I9	C622	F2	Q153	B3	RD76	A4	R453	E7
CD09	I8	C623	F2	Q154	B4	RD77	A5	R454	E6
CD11	I9	C631	E2	Q155	B3	RD78	A5	R455	E6
CD12	I9	C632	E2	Q156	C3	RD79	A5	R456	E7
CD17	H8	C633	E2	Q157	B3	RD80	A5	R457	E6
CD18	I9	C641	J2	Q201	F4	RD81	A6	R458	E6
CD21	A9	C642	I2	Q202	F4	RD82	A6	R459	E6
CD23	J8	C643	I2	Q203	F4	RD83	A6	R460	E6
CD24	I8	C651	H2	Q204	F4	RD84	A6	R461	E6
CD40	C8	C652	H2	Q205	G3	RD85	A6	R462	E6
CD41	B8	C653	H2	Q206	G3	RD86	A6	R463	E5
CD42	B8	C701	I5	Q207	F3	RD87	A6	R464	E5
CD43	C7	C702	J5	Q251	E4	RD88	A6	R465	E7
CD44	C8	C703	J5	Q252	E4	RD89	A6	R466	E7
CD45	C8	C704	I3	Q253	E4	RD90	A6	R467	E8
CD46	D8	C705	I4	Q254	E4	R101	D5	R501	I7
CD47	C8	C711	J3	Q255	E3	R102	D5	R502	I7
CD48	C7	C712	I3	Q256	E3	R103	D5	R503	I7
CD49	C8	C751	G5	Q257	E3	R104	D4	R504	I6
CD50	F8	C752	H5	Q301	D7	R105	D4	R505	I6
CD51	E8	C753	H5	Q302	C7	R106	C4	R506	I7
CD52	E8	C754	G3	Q303	D6	R107	D4	R507	I6
CD53	F8	C755	H4	Q304	D6	R108	D4	R508	I6
CD54	F8	C761	H2	Q305	D6	R109	C4	R509	I6
CD55	F8	C762	G2	Q306	D5	R110	C4	R510	I6
CD56	F8	DD21	A8	Q307	C5	R111	C3	R511	I6
CD57	F8	DD23	J8	Q351	B7	R112	D3	R512	I6
CD58	F8	DN31	C2	Q352	B7	R113	D3	R513	I5
CD59	F8	DN32	F2	Q353	B6	R114	D3	R514	I5
CD60	I8	DN33	H2	Q354	B6	R151	B5	R515	J7
CD61	H8	D101	C4	Q355	B6	R152	B5	R516	I7
CD62	H8	D102	C4	Q356	C5	R153	B5	R517	I7
CD63	H7	D103	C4	Q357	B5	R154	B4	R551	H7
CD64	H8	D151	B4	Q401	F7	R155	B4	R552	H7
CD65	I8	D152	B4	Q402	F7	R156	B4	R553	H7
CD66	I8	D153	B4	Q403	G6	R157	B4	R554	H6
CD67	I8	D201	F3	Q404	G6	R158	B4	R555	H6
CD68	I7	D202	F4	Q405	G6	R159	B4	R556	G7
CD69	I8	D203	F4	Q406	G5	R160	B4	R557	H6
CD71	A2	D251	E4	Q407	F5	R161	B3	R558	H6
CD72	A2	D252	E4	Q451	E7	R162	B3	R559	H6
CD91	J9	D253	E4	Q452	E7	R163	B3	R560	G6
CD92	J9	D301	C6	Q453	E6	R164	B3	R561	H6
CD93	A8	D302	C6	Q454	E6	R201	F5	R562	H6
CD94	A9	D303	C6	Q455	E6	R202	F5	R563	H5
CD95	A5	D351	B6	Q456	F5	R203	F5	R564	H5
CD96	A5	D352	B6	Q457	E5	R204	F4	R565	H7
C101	C5	D353	B6	Q501	I7	R205	F4	R566	H7
C102	D5	D401	F6	Q502	I7	R206	F4	R567	H8
C103	D5	D402	F6	Q503	I6	R207	F4	R601	C2
C104	C3	D403	F6	Q504	I6	R208	F4	R602	D2
C105	D4	D451	E6	Q505	I6	R209	F4	R603	D2
C111	D2	D452	E6	Q506	J5	R210	F4	R611	C2
C112	C2	D453	E6	Q507	I5	R211	F3	R612	B2
C151	B5	D501	I6	Q551	H7	R212	F3	R613	C2
C152	C5	D502	I6	Q552	H7	R213	F3	R621	F2
C153	C5	D503	I6	Q553	H6	R214	F3	R622	F2
C154	B3	D551	G6	Q554	H6	R251	E5	R623	G2
C155	C4	D552	G6	Q555	H6	R252	E5	R631	E2
C161	C2	D553	G6	Q556	H5	R253	E5	R632	E2
C162	B2	D601	C2	Q557	G5	R254	E4	R633	E2
C201	F5	D621	F2	Q701	I4	R255	E4	R641	I2
C202	G5	D641	I2	Q702	I4	R256	E4	R642	I2
C203	G5	D701	I4	Q703	I4	R257	E4	R643	J2
C204	F3	D702	I4	Q704	I4	R258	E4	R651	H2
C205	G4	D703	I4	Q705	I3	R259	E4	R652	H2
C211	G3	D751	G4	Q706	J3	R260	E4	R653	H2
C212	F2	D752	G4	Q707	I3	R261	E3	R701	I5
C251	E5	D753	G4	Q751	H4	R262	E3	R702	I5
C252	F5	JD01	I9	Q752	H4	R263	E3	R703	I5
C253	F5	JD02	A3	Q753	H4	R264	E3	R704	I4
C254	E3	J601	D1	Q754	H4	R301	D7	R705	I4
C255	E4	J611	C2	Q755	H3	R302	D7	R706	I4
C261	E2	J621	G2	Q756	H3	R303	D7	R707	I4
C262	E2	J631	E1	Q757	H3	R304	D6	R708	I4
C301	D7	J641	J1	RD01	J8	R305	D6	R709	I4
C302	D7	J651	H1	RD02	J9	R306	C7	R710	I4
C303	C6	LD01	J9	RD03	I9	R307	D6	R711	I3
C317	C7	LD02	G9	RD04	G9	R308	D6	R712	I3
C318	D7	LD41	B8	RD05	G9	R309	C6	R713	I3
C321	D5	LD51	E8	RD06	G9	R310	C6	R714	I3
C322	C5	LD61	H8	RD07	G9	R311	C6	R751	H5
C351	B7	LN31	C2	RD08	G9	R312	D6	R752	H5
C352	C7	LN32	F2	RD09	I9	R313	D5	R753	H5
C353	B6	LN33	H2	RD11	H9	R314	D5	R754	H4
C367	B7	L601	D2	RD12	H9	R315	D7	R755	H4
C368	C7	L602	C3	RD13	H9	R316	C7	R756	G4
C371	C5	L611	B2	RD14	H9	R317	C7	R757	H4
C372	B5	L621	G2	RD15	H9	R351	B7	R758	H4
C401	G7	L622	F2	RD16	H9	R352	B7	R759	H4
C402	G7	L631	E2	RD17	H9	R353	B7	R760	G4
C403	F6	L641	I2	RD18	H9	R354	B6	R761	H3
C417	F7	L642	I3	RD21	B8	R355	B6	R762	H3
C418	G7	L651	H2	RD22	B8	R356	B7	R763	H3
C421	G5	QD01	J8	RD26	B9	R357	B6	R764	H3
C422	F5	QD02	I9	RD27	B9	R358	B6	SD71	A2
C451	E7	QD03	G9	RD28	B9	R359	B6	XD01	J8
C452	E7	QD04	G9	RD29	A8	R360	B6	031L	B2
C453	E6	QD05	J9	RD30	A8	R361	B6		
C467	E8	QD06	I8	RD33	B8	R362	B6		
C468	E7	QD21	B9	RD34	B8	R363	B5		
C471	F5	QD22	A8	RD41	C9	R364	B5		
C472	E5	QD23	J8	RD42	C9	R365	C7		
C501	J7	QD32	B8	RD43	B8	R366	C7		
C502	J7	QD41	C8	RD44	D8	R367	C8		
C503	I6	QD51	F8	RD45	D8	R401	F7		
C517	I7	QD61	H8	RD46	C8	R402	G7		
C518	I7	QD71	A4	RD51	F9	R403	F7		
C521	J5	QD72	A4	RD52	F9	R404	F6		
C522	I5	QD73	A5	RD53	E8	R405	F6		
C551	H7	QD74	A5	RD54	F8	R406	F7		
C552	H7	QD75	A6	RD55	F8	R407	F6		
C553	G6	QD76	A6	RD56	E8	R408	F6		
C567	H7	QD77	A6	RD61	I9	R409	F6		
C568	H7	QD78	A6	RD62	I9	R410	F6		
C571	H5	Q101	D4	RD63	H8	R411	F6		
C572	G5	Q102	C4	RD64	I8	R412	F6		

Layout DAC board (Bottom view)



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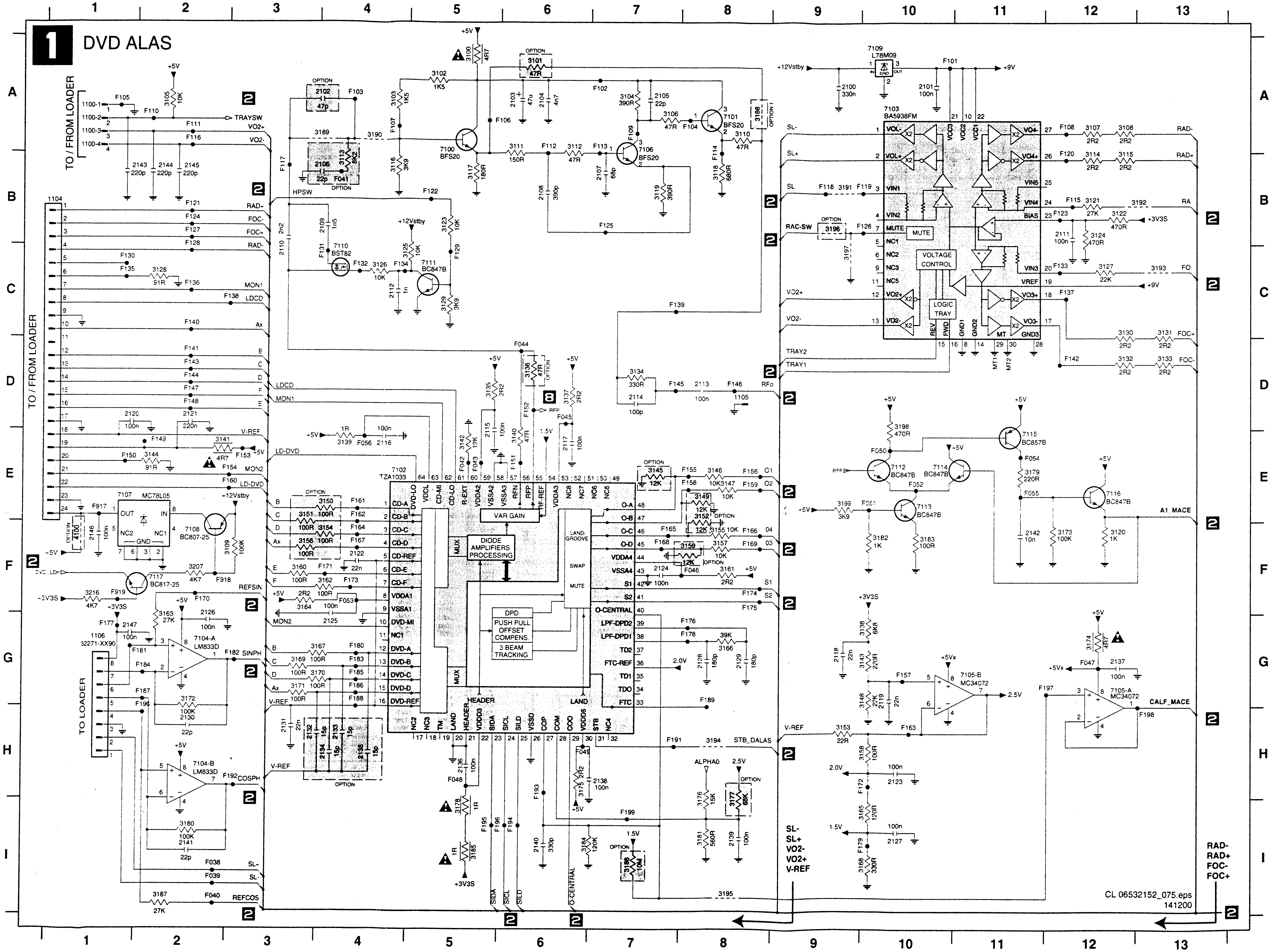
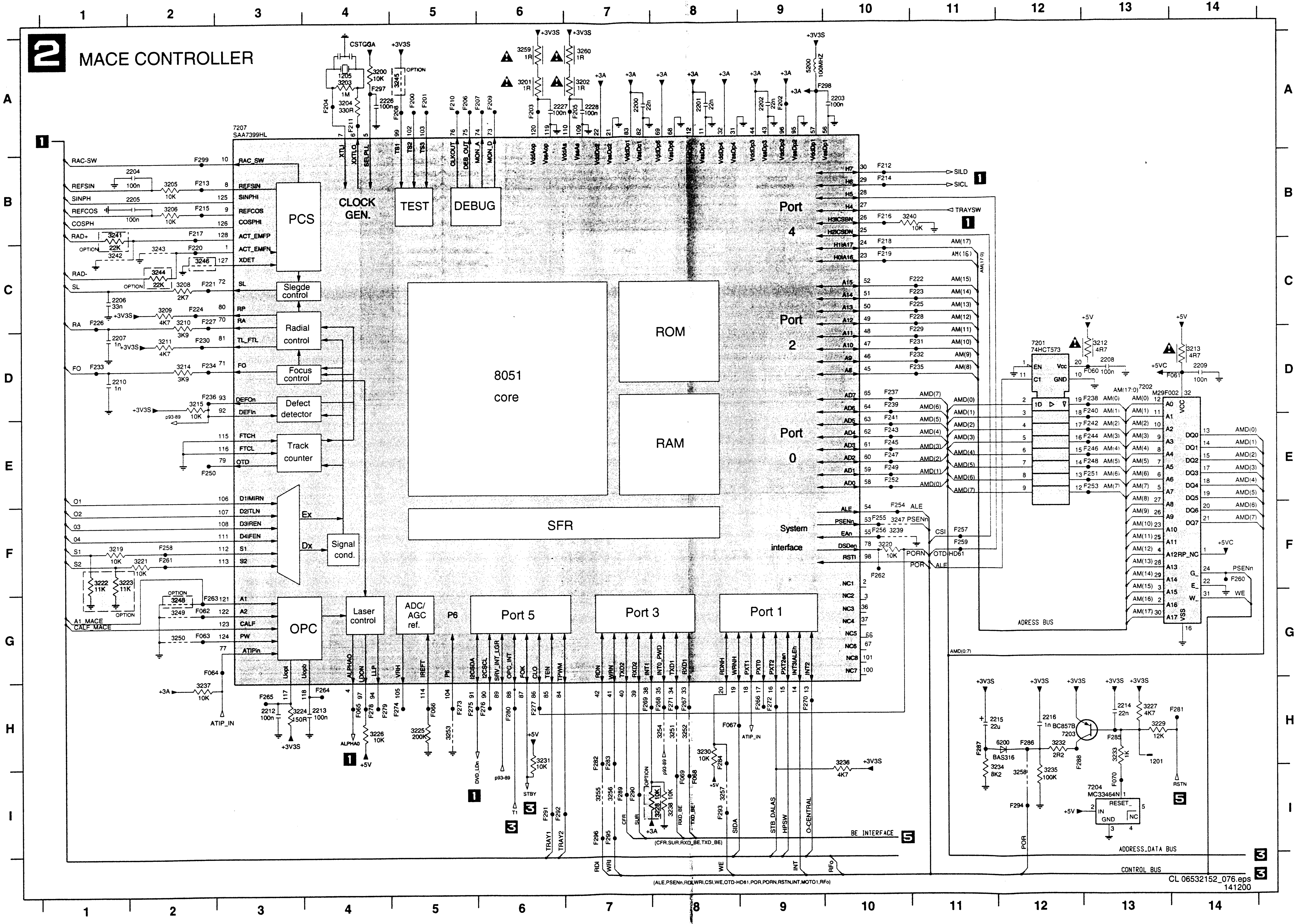
CD01	J9	C601	D2	Q103	D4	RD65	I8	R413	F5
CD02	J8	C602	C2	Q104	D4	RD66	H8	R414	F5
CD03	J8	C603	C2	Q105	D3	RD71	A4	R415	G7
CD04	J9	C611	B2	Q106	D3	RD72	A4	R416	F7
CD05	I9	C612	C2	Q107	C3	RD73	A4	R417	F7
CD06	G9	C613	B2	Q151	B4	RD74	A4	R451	E7
CD07	J9	C621	G2	Q152	B4	RD75	A4	R452	E7
CD08	I9	C622	F2	Q153	B3	RD76	A4	R453	E7
CD09	I8	C623	F2	Q154	B4	RD77	A5	R454	E6
CD11	I9	C631	E2	Q155	B3	RD78	A5	R455	E6
CD12	I9	C632	E2	Q156	C3	RD79	A5	R456	E7
CD17	H8	C633	E2	Q157	B3	RD80	A5	R457	E6
CD18	I9	C641	J2	Q201	F4	RD81	A6	R458	E6
CD21	A9	C642	I2	Q202	F4	RD82	A6	R459	E6
CD23	J8	C643	I2	Q203	F4	RD83	A6	R460	E6
CD24	I8	C651	H2	Q204	F4	RD84	A6	R461	E6
CD40	C8	C652	H2	Q205	G3	RD85	A6	R462	E6
CD41	B8	C653	H2	Q206	G3	RD86	A6	R463	E5
CD42	B8	C701	I5	Q207	F3	RD87	A6	R464	E5
CD43	C7	C702	J5	Q251	E4	RD88	A6	R465	E7
CD44	C8	C703	J5	Q252	E4	RD89	A6	R466	E7
CD45	C8	C704	I3	Q253	E4	RD90	A6	R467	E8
CD46	D8	C705	I4	Q254	E4	R101	D5	R501	I7
CD47	C8	C711	J3	Q255	E3	R102	D5	R502	I7
CD48	C7	C712	I3	Q256	E3	R103	D5	R503	I7
CD49	C8	C751	G5	Q257	E3	R104	D4	R504	I6
CD50	F8	C752	H5	Q301	D7	R105	D4	R505	I6
CD51	E8	C753	H5	Q302	C7	R106	C4	R506	I7
CD52	E8	C754	G3	Q303	D6	R107	D4	R507	I6
CD53	F8	C755	H4	Q304	D6	R108	D4	R508	I6
CD54	F8	C761	H2	Q305	D6	R109	C4	R509	I6
CD55	F8	C762	G2	Q306	D5	R110	C4	R510	I6
CD56	F8	DD21	A8	Q307	C5	R111	C3	R511	I6
CD57	F8	DD23	J8	Q351	B7	R112	D3	R512	I6
CD58	F8	DN31	C2	Q352	B7	R113	D3	R513	I5
CD59	F8	DN32	F2	Q353	B6	R114	D3	R514	I5
CD60	I8	DN33	H2	Q354	B6	R151	B5	R515	J7
CD61	H8	D101	C4	Q355	B6	R152	B5	R516	I7
CD62	H8	D102	C4	Q356	C5	R153	B5	R517	I7
CD63	H7	D103	C4	Q357	B5	R154	B4	R551	H7
CD64	H8	D151	B4	Q401	F7	R155	B4	R552	H7
CD65	I8	D152	B4	Q402	F7	R156	B4	R553	H7
CD66	I8	D153	B4	Q403	G6	R157	B4	R554	H6
CD67	I8	D201	F3	Q404	G6	R158	B4	R555	H6
CD68	I7	D202	F4	Q405	G6	R159	B4	R556	G7
CD69	I8	D203	F4	Q406	G5	R160	B4	R557	H6
CD71	A2	D251	E4	Q407	F5	R161	B3	R558	H6
CD72	A2	D252	E4	Q451	E7	R162	B3	R559	H6
CD91	J9	D253	E4	Q452	E7	R163	B3	R560	G6
CD92	J9	D301	C6	Q453	E6	R164	B3	R561	H6
CD93	A8	D302	C6	Q454	E6	R201	F5	R562	H6
CD94	A9	D303	C6	Q455	E6	R202	F5	R563	H5
CD95	A5	D351	B6	Q456	F5	R203	F5	R564	H5
CD96	A5	D352	B6	Q457	E5	R204	F4	R565	H7
C101	C5	D353	B6	Q501	I7	R205	F4	R566	H7
C102	D5	D401	F6	Q502	I7	R206	F4	R567	H8
C103	D5	D402	F6	Q503	I6	R207	F4	R601	C2
C104	C3	D403	F6	Q504	I6	R208	F4	R602	D2
C105	D4	D451	E6	Q505	I6	R209	F4	R603	D2
C111	D2	D452	E6	Q506	J5	R210	F4	R611	C2
C112	C2	D453	E6	Q507	I5	R211	F3	R612	B2
C151	B5	D501	I6	Q551	H7	R212	F3	R613	C2
C152	C5	D502	I6	Q552	H7	R213	F3	R621	F2
C153	C5	D503	I6	Q553	H6	R214	F3	R622	F2
C154	B3	D551	G6	Q554	H6	R251	E5	R623	G2
C155	C4	D552	G6	Q555	H6	R252	E5	R631	E2
C161	C2	D553	G6	Q556	H5	R253	E5	R632	E2
C162	B2	D601	C2	Q557	G5	R254	E4	R633	E2
C201	F5	D621	F2	Q701	I4	R255	E4	R641	I2
C202	G5	D641	I2	Q702	I4	R256	E4	R642	I2
C203	G5	D701	I4	Q703	I4	R257	E4	R643	J2
C204	F3	D702	I4	Q704	I4	R258	E4	R651	H2
C205	G4	D703	I4	Q705	I3	R259	E4	R652	H2
C211	G3	D751	G4	Q706	J3	R260	E4	R653	H2
C212	F2	D752	G4	Q707	I3	R261	E3	R701	I5
C251	E5	D753	G4	Q751	H4	R262	E3	R702	I5
C252	F5	JD01	I9	Q752	H4	R263	E3	R703	I5
C253	F5	JD02	A3	Q753	H4	R264	E3	R704	I4
C254	E3	J601	D1	Q754	H4	R301	D7	R705	I4
C255	E4	J611	C2	Q755	H3	R302	D7	R706	I4
C261	E2	J621	G2	Q756	H3	R303	D7	R707	I4
C262	E2	J631	E1	Q757	H3	R304	D6	R708	I4
C301	D7	J641	J1	RD01	J8	R305	D6	R709	I4
C302	D7	J651	H1	RD02	J9	R306	C7	R710	I4
C303	C6	LD01	J9	RD03	I9	R307	D6	R711	I3
C317	C7	LD02	G9	RD04	G9	R308	D6	R712	I3
C318	D7	LD41	B8	RD05	G9	R309	C6	R713	I3
C321	D5	LD51	E8	RD06	G9	R310	C6	R714	I3
C322	C5	LD61	H8	RD07	G9	R311	C6	R751	H5
C351	B7	LN31	C2	RD08	G9	R312	D6	R752	H5
C352	C7	LN32	F2	RD09	I9	R313	D5	R753	H5
C353	B6	LN33	H2	RD11	H9	R314	D5	R754	H4
C367	B7	L601	D2	RD12	H9	R315	D7	R755	H4
C368	C7	L602	C3	RD13	H9	R316	C7	R756	G4
C371	C5	L611	B2	RD14	H9	R317	C7	R757	H4
C372	B5	L621	G2	RD15	H9	R351	B7	R758	H4
C401	G7	L622	F2	RD16	H9	R352	B7	R759	H4
C402	G7	L631	E2	RD17	H9	R353	B7	R760	G4
C403	F6	L641	I2	RD18	H9	R354	B6	R761	H3
C417	F7	L642	I3	RD21	B8	R355	B6	R762	H3
C418	G7	L651	H2	RD22	B8	R356	B7	R763	H3
C421	G5	QD01	J8	RD26	B9	R357	B6	R764	H3
C422	F5	QD02	I9	RD27	B9	R358	B6	SD71	A2
C451	E7	QD03	G9	RD28	B9	R359	B6	XD01	J8
C452	E7	QD04	G9	RD29	A8	R360	B6	031L	B2
C453	E6	QD05	J9	RD30	A8	R361	B6		
C467	E8	QD06	I8	RD33	B8	R362	B6		
C468	E7	QD21	B9	RD34	B8	R363	B5		
C471	F5	QD22	A8	RD41	C9	R364	B5		
C472	E5	QD23	J8	RD42	C9	R365	C7		
C501	J7	QD32	B8	RD43	B8	R366	C7		
C502	J7	QD41	C8	RD44	D8	R367	C8		
C503	I6	QD51	F8	RD45	D8	R401	F7		
C517	I7	QD61	H8	RD46	C8	R402	G7		
C518	I7	QD71	A4	RD51	F9	R403	F7		
C521	J5	QD72	A4	RD52	F9	R404	F6		
C522	I5	QD73	A5	RD53	E8	R405	F6		
C551	H7	QD74	A5	RD54	F8	R406	F7		
C552	H7	QD75	A6	RD55	F8	R407	F6		
C553	G6	QD76	A6	RD56	E8	R408	F6		
C567	H7	QD77	A6	RD61	I9	R409	F6		
C568	H7	QD78	A6	RD62	I9	R410	F6		
C571	H5	Q101	D4	RD63	H8	R411	F6		
C572	G5	Q102	C4	RD64	I8	R412	F6		

Mono board: DVD ALAS


1
DVD ALAS
TO / FROM LOADER
TO LOADER
7102 TZA1033
7103 BA5938FM
7109 L78M09
7107 MC78L05
7108 BC807-25
7117 BC817-25
7100 BFS20
7101 BFS20
7106 BFS20
7110 BST82
7111 BC847B
7104-A LM833D
7104-B LM833D
7105-A MC34072
7105-B MC34072
7112 BC847B
7113 BC847B
7114 BC847B
7115 BC857B
7116 BC847B
1106 52271-XX90
VAR GAIN
DIODE AMPLIFIERS PROCESSING
DPD PUSH PULL OFFSET COMPENS.
3 BEAM TRACKING
MUX
LAND GROOVE
SWAP
MUTE
VOLTAGE CONTROL
LOGIC TRAY
OPTION
TRAYSW
HPSW
RAD-
FOC-
FOC+
RAD+
MON1
LDCD
LD-DVD
MON2
V-REF
REFSIN
SINPH
COSPH
REFCOS
SL-
SL+
VO2-
VO2+
RAC-SW
TRAY1
TRAY2
RA
FO
FOC+
FOC-
RFo
A1_MACE
CALF_MACE
STB_DALAS
ALPHA0
SIDA
SICL
SILD
O-CENTRAL
+12Vstby
+9V
+5V
+3V3S
-3V3S
-5V
2.5V
2.0V
1.5V
SL- SL+ VO2- VO2+ V-REF
RAD- RAD+ FOC- FOC+
CL 06532152_075.eps
141200
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I

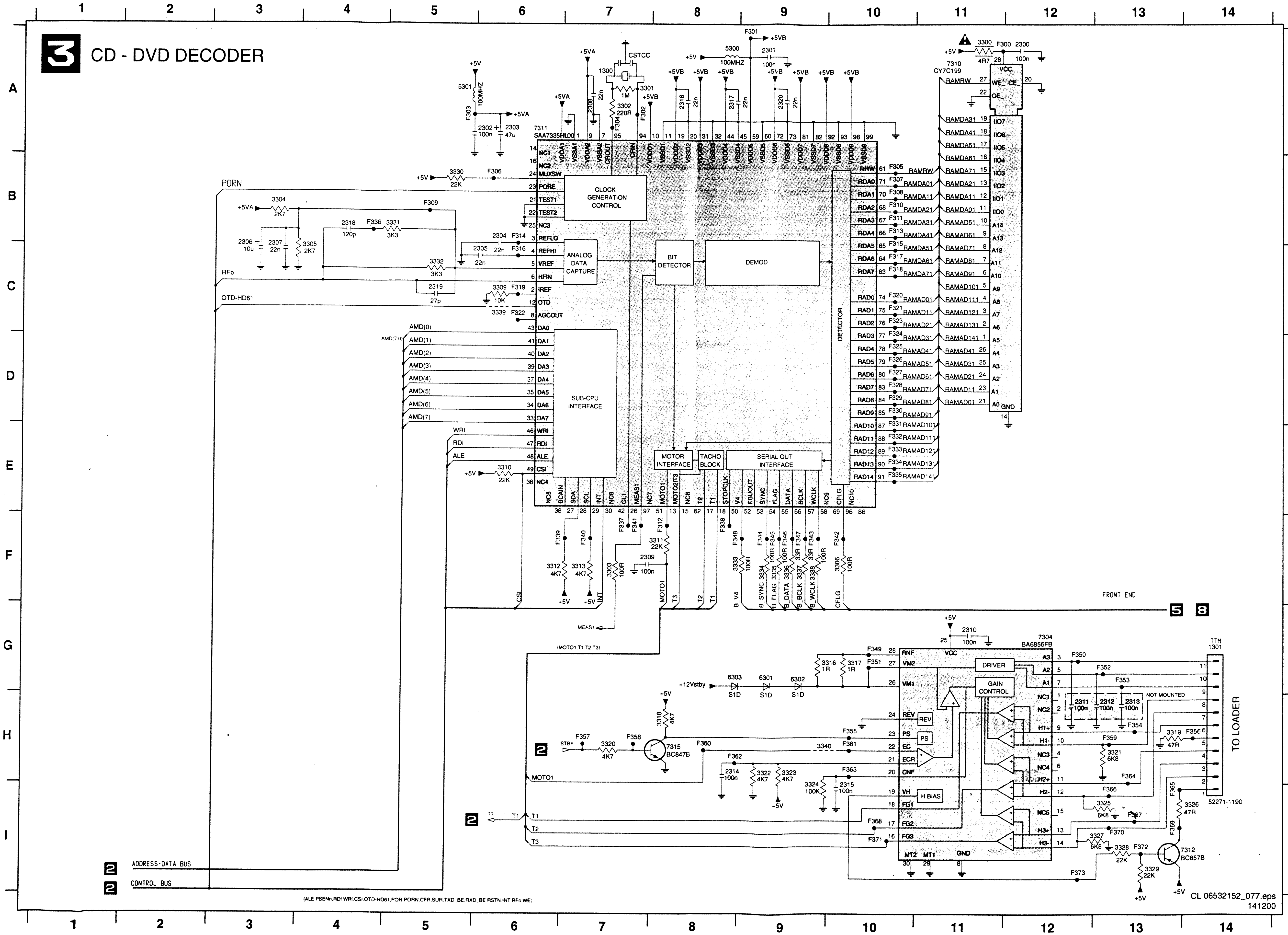
1100-1	A1
1100-2	A1
1100-3	A1
1100-4	A1
1104	B1
1105	D8
1106	G1
2100	A9
2101	A10
2102	A4
2103	A6
2104	A6
2105	A7
2106	B4
2107	B7
2108	B6
2109	B4
2110	C3
2111	B12
2112	C4
2113	D8
2114	D7
2115	E5
2116	E4
2117	E6
2118	G9
2119	G10
2120	D1
2121	D2
2122	F4
2123	H10
2124	F7
2125	G4
2126	G2
2127	I10
2128	G8
2129	G8
2130	H2
2131	H3
2132	H3
2133	H4
2134	H4
2135	H4
2136	H5
2137	G12
2138	H7
2139	I8
2140	I6
2141	I2
2142	F11
2143	B2
2144	B2
2145	B2
2146	F1
2147	G1
3100	A5
3101	A6
3102	A5
3103	A4
3104	A7
3105	A2
3106	A7
3107	A12
3108	A12
3109	F2
3110	A8
3111	A6
3112	A6
3113	B4
3114	B12
3115	B12
3116	B4
3117	B5
3118	B8
3119	B7
3120	F12
3121	B12
3122	B12
3123	B5
3124	B12
3125	C4
3126	C4
3127	C12
3128	C2
3129	C5
3130	C12
3131	C13
3132	D12
3133	D13
3134	D7
3135	D5
3136	D6
3137	D6
3138	G10
3139	E4
3140	E6
3141	E2
3142	E5
3143	G10
3144	E2
3145	E7
3146	E8
3147	E8
3148	G10
3149	E8
3150	E4
3151	E3
3152	E8
3153	H9
3154	F4
3155	F8
3156	F3
3157	F8
3158	H10
3159	F8
3160	F3
3161	F8
3162	F4
3163	G2
3164	F3
3165	I10
3166	G8
3167	G4
3168	I10
3169	G3
3170	G4
3171	G3
3172	G2
3173	F12
3174	G12
3175	H6
3176	H8
3177	H8
3178	I5
3179	E11
3180	I2
3181	I8
3182	F10
3183	F10
3184	I6
3185	I5
3186	I7
3187	I2
3188	A8
3189	A4
3190	A4
3191	B9
3192	B13
3193	C13
3194	H8
3195	I8
3196	B9
3197	C9
3198	D10
3199	E9
3207	F2
3216	F1
4100	F1
7100	A5
7101	A8
7102	E4
7103	A10
7104-A	G2
7104-B	H2
7105-A	G12
7105-B	G11
7106	A7
7107	E1
7108	F2
7109	A10
7110	C4
7111	C5
7112	E10
7113	E10
7114	E10
7115	E11
7116	E12
7117	F2
F038	I2
F039	I2
F040	I2
F041	B4
F042	E5
F043	E5
F044	D6
F045	D6
F046	F8
F047	G12
F048	H5
F049	H6
F050	E10
F051	E10
F052	E10
F053	F4
F054	E11
F055	E11
F056	E4
F101	A10
F102	A7
F103	A4
F104	A8
F105	A1
F106	A6
F107	A4
F108	A12
F109	A7
F110	A2
F111	A2
F112	A6
F113	A7
F114	A8
F115	B12
F116	A2
F117	B3
F118	B9
F119	B10
F120	B12
F121	B2
F122	B5
F123	B12
F124	B2
F125	B7
F126	B10
F127	B2
F128	C2
F129	C5
F130	C1
F131	C4
F132	C4
F133	C12
F134	C4
F135	C1
F136	C2
F137	C12
F138	C3
F139	C7
F140	C2
F141	D2
F142	D12
F143	D2
F144	D2
F145	D7
F146	D8
F147	D2
F148	D2
F149	E2
F150	E1
F151	E6
F152	D6
F153	E3
F154	E3
F155	E8
F156	E8
F157	G10
F158	E8
F159	E8
F160	E3
F161	E4
F162	E4
F163	H10
F164	F4
F165	F7
F166	F8
F167	F4
F168	F7
F169	F8
F170	F2
F171	F4
F172	H10
F173	F4
F174	F8
F175	F8
F176	G8
F177	G1
F178	G8
F179	I10
F180	G4
F181	G2
F182	G3
F183	G4
F184	G2
F185	G4
F186	G4
F187	G2
F188	G4
F189	G8
F190	H2
F191	H7
F192	H3
F193	H6
F194	I6
F195	I5
F196	I6
F197	G12
F198	H13
F199	I7
F917	E1
F918	F2
F919	F1

Mono board: MACE controller


2 MACE CONTROLLER
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H I
7207
SAA7399HL
PCS
Slegde control
Radial control
Focus control
Defect detector
Track counter
Signal cond.
OPC
Laser control
ADC/ AGC ref.
P6
CLOCK GEN.
TEST
DEBUG
8051 core
ROM
RAM
SFR
Port 4
Port 2
Port 0
System interface
Port 5
Port 3
Port 1
Ex
Dx
RAC-SW
REFSIN
SINPH
REFCOS
COSPH
RAD+
RAD-
SL
RA
FO
O1
O2
O3
O4
S1
S2
A1_MACE
CALF_MACE
ATIP_IN
CSTGQA
1205
3200 10K
3245 OPTION
+3V3S
+3A
+5V
SILD
SICL
TRAYSW
7201 74HCT573
7202 M29F002
7203 BC857B
7204 MC33464N
AM(17:0)
AMD(0:7)
ADRESS BUS
ALE
PSENn
WE
CSI
OTD-HD61
PORN
POR
RSTN
STBY
T1
DVD_LDn
ALPHA0
TRAY1
TRAY2
SIDA
STB_DALAS
HPSW
O-CENTRAL
BE_INTERFACE
(CFR,SUR,RXD_BE,TXD_BE)
ADDRESS_DATA BUS
CONTROL BUS
(ALE,PSENn,RDI,WRI,CSI,WE,OTD-HD61,POR,PORN,RSTN,INT,MOTO1,RFo)
CL 06532152_076.eps
141200

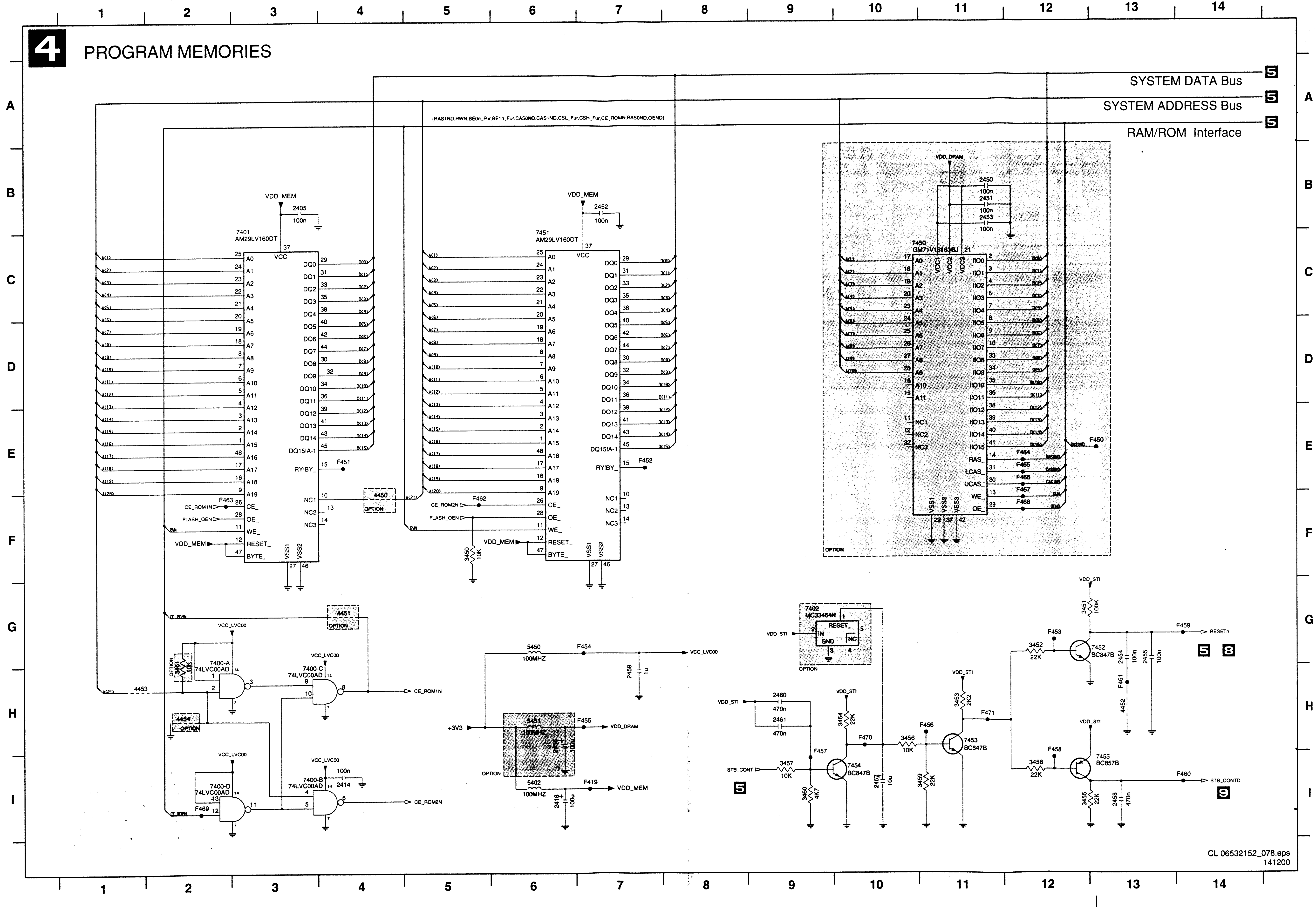
1201	H13
1205	A4
2200	A7
2201	A8
2202	A9
2203	A10
2204	B2
2205	B2
2206	C1
2207	D1
2208	D13
2209	D14
2210	D1
2212	H3
2213	H4
2214	H13
2215	H11
2216	H12
2226	A4
2227	A6
2228	A7
3200	A4
3201	A6
3202	A7
3203	A4
3204	A4
3205	B2
3206	B2
3208	C2
3209	C2
3210	C2
3211	D2
3212	D13
3213	D14
3214	D2
3215	D2
3219	F1
3220	F10
3221	F2
3222	F1
3223	F1
3224	H3
3225	H5
3226	H4
3227	H13
3228	I8
3229	H13
3230	H8
3231	H6
3232	H12
3233	H13
3234	I11
3235	I12
3236	H10
3237	H2
3238	I8
3239	F10
3240	B10
3241	B1
3242	C1
3243	C2
3244	C2
3245	A5
3246	C2
3247	F10
3248	G2
3249	G2
3250	G2
3251	H8
3252	H8
3253	H5
3254	H8
3255	I7
3256	I7
3257	I8
3258	I12
3259	A6
3260	A7
5200	A9
6200	H12
7201	D12
7202	D13
7203	H12
7204	I13
7207	A3
F060	D13
F061	D14
F062	G2
F063	G2
F064	G2
F065	H4
F066	H5
F067	H8
F068	I8
F069	I8
F070	I13
F200	A5
F201	A5
F202	A9
F203	A6
F204	A4
F205	A7
F206	A5
F207	A6
F208	A5
F209	A6
F210	A5
F211	A4
F212	B10
F213	B2
F214	B10
F215	B2
F216	B10
F217	B2
F218	C10
F219	C10
F220	C2
F221	C2
F222	C11
F223	C11
F224	C2
F225	C11
F226	C1
F227	C2
F228	C11
F229	D11
F230	D2
F231	D11
F232	D11
F233	D1
F234	D2
F235	D11
F236	D2
F237	D10
F238	D13
F239	D10
F240	D13
F241	E10
F242	E13
F243	E10
F244	E13
F245	E10
F246	E13
F247	E10
F248	E13
F249	E10
F250	E2
F251	E13
F252	E10
F253	E13
F254	F10
F255	F10
F256	F10
F257	F11
F258	F2
F259	F11
F260	F14
F261	F2
F262	F10
F263	G2
F264	H4
F265	H3
F266	H9
F267	H8
F268	H8
F269	H7
F270	H9
F271	H8
F272	H9
F273	H5
F274	H5
F275	H5
F276	H6
F277	H6
F278	H4
F279	H4
F280	H6
F281	H14
F282	H7
F283	H7
F284	H8
F285	H13
F286	H12
F287	H11
F288	H12
F289	I7
F290	I7
F291	I6
F292	I6
F293	I8
F294	I12
F295	I7
F296	I7
F297	A4
F298	A10
F299	B2

Mono board: CD - DVD decoder


3
CD - DVD DECODER
7311
SAA7335H
CLOCK GENERATION CONTROL
ANALOG DATA CAPTURE
BIT DETECTOR
DEMOD
DETECTOR
SUB-CPU INTERFACE
MOTOR INTERFACE
TACHO BLOCK
SERIAL OUT INTERFACE
NC1
NC2
MUXSW
PORE
TEST1
TEST2
NC3
REFLO
REFHI
VREF
HFIN
IREF
OTD
AGCOUT
DA0
DA1
DA2
DA3
DA4
DA5
DA6
DA7
WRI
RDI
ALE
CSI
NC4
RRW
RDA0
RDA1
RDA2
RDA3
RDA4
RDA5
RDA6
RDA7
RAD0
RAD1
RAD2
RAD3
RAD4
RAD5
RAD6
RAD7
RAD8
RAD9
RAD10
RAD11
RAD12
RAD13
RAD14
PORN
RFo
OTD-HD61
AMD(0)
AMD(1)
AMD(2)
AMD(3)
AMD(4)
AMD(5)
AMD(6)
AMD(7)
AMD(7:0)
WRI
RDI
ALE
CSTCC
7310
CY7C199
RAMRW
WE_
CE_
OE_
VCC
GND
FRONT END
5
8
MEAS1
(MOTO1,T1,T2,T3)
7304
BA6856FB
DRIVER
GAIN CONTROL
REV
PS
H BIAS
RNF
VM2
VM1
EC
ECR
CNF
VH
FG1
FG2
FG3
MT2
MT1
GND
NC1
NC2
NC3
NC4
NC5
H1+
H1-
H2+
H2-
H3+
H3-
A1
A2
A3
NOT MOUNTED
TTM
1301
TO LOADER
52271-1190
7315
BC847B
7312
BC857B
STBY
+12Vstby
6303
6301
6302
S1D
MOTO1
T1
T2
T3
2
ADDRESS-DATA BUS
CONTROL BUS
(ALE PSENn RDI WRI CSI OTD-HD61 POR PORN CFR SUR TXD BE RXD BE RSTN INT RFo WE)
+5V
+5VA
+5VB
CL 06532152_077.eps
141200
1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I

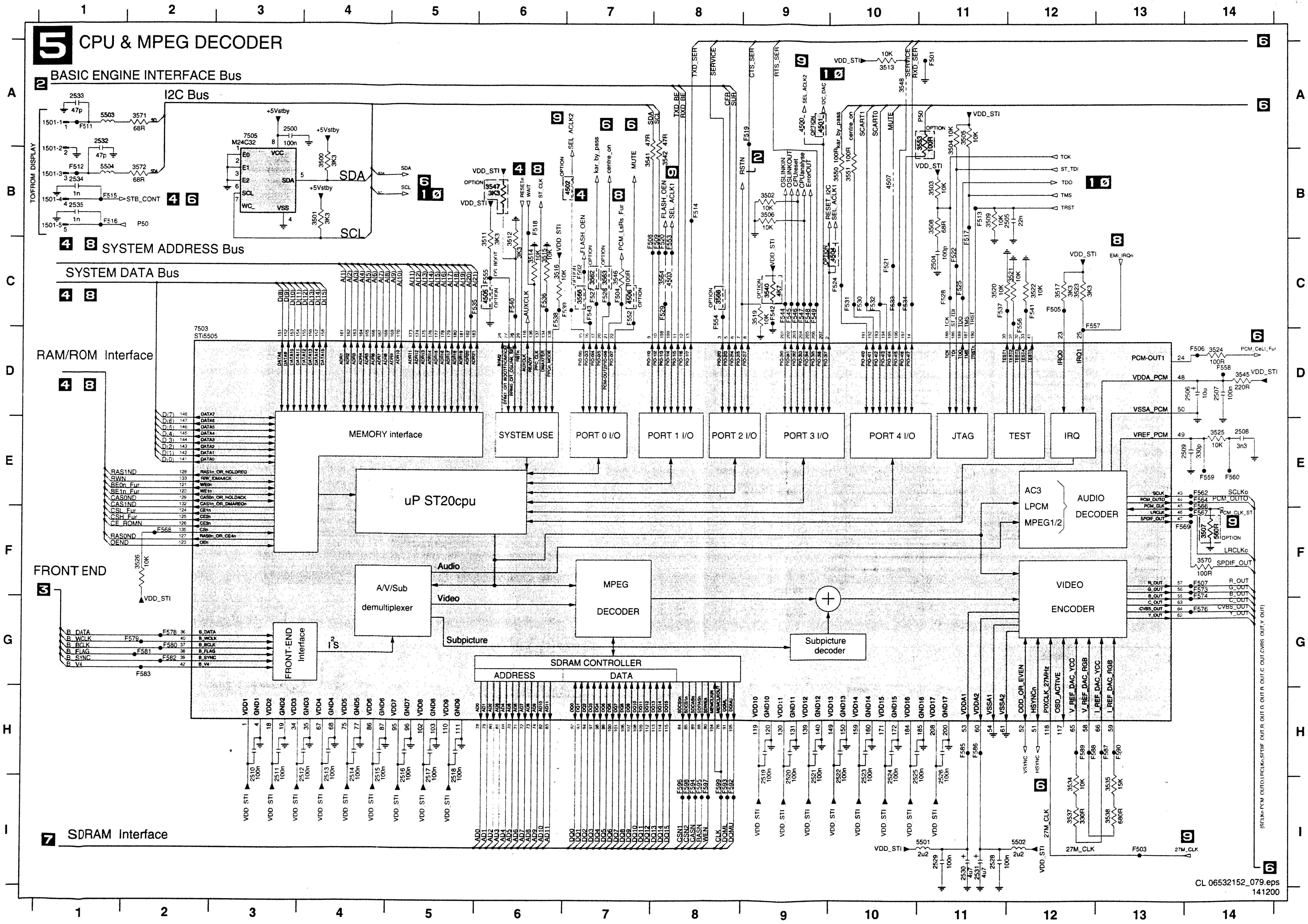
1300	A7
1301	G14
2300	A12
2301	A9
2302	A6
2303	A6
2304	B6
2305	C6
2306	C3
2307	C3
2308	A7
2309	F7
2310	G11
2311	H12
2312	H13
2313	H13
2314	H8
2315	I10
2316	A8
2317	A8
2318	B4
2319	C5
2320	A9
3300	A11
3301	A7
3302	A7
3303	F7
3304	B3
3305	C4
3306	F10
3309	C6
3310	E6
3311	F8
3312	F6
3313	F7
3316	G10
3317	G10
3318	H8
3319	H13
3320	H7
3321	H13
3322	H9
3323	H9
3324	I9
3325	I13
3326	I14
3327	I13
3328	I13
3329	I13
3330	B5
3331	B5
3332	C5
3333	F8
3334	F9
3335	F9
3336	F9
3337	F9
3338	F9
3339	C6
3340	H9
5300	A8
5301	A5
6301	G9
6302	G9
6303	G8
7304	G12
7310	A11
7311	A6
7312	I13
7315	H8
F300	A11
F301	A9
F302	A7
F303	A5
F304	A7
F305	B10
F306	B6
F307	B10
F308	B10
F309	B5
F310	B10
F311	B10
F312	F8
F313	B10
F314	B6
F315	C10
F316	C6
F317	C10
F318	C10
F319	C6
F320	C10
F321	C10
F322	C6
F323	C10
F324	D10
F325	D10
F326	D10
F327	D10
F328	D10
F329	D10
F330	D10
F331	E10
F332	E10
F333	E10
F334	E10
F335	E10
F336	B4
F337	F7
F338	F8
F339	F6
F340	F7
F341	F7
F342	F10
F343	F9
F344	F9
F345	F9
F346	F9
F347	F9
F348	F8
F349	G10
F350	G12
F351	G10
F352	G13
F353	G13
F354	H13
F355	H10
F356	H14
F357	H7
F358	H7
F359	H13
F360	H8
F361	H10
F362	H8
F363	H10
F364	H13
F365	I13
F366	I13
F367	I13
F368	I10
F369	I13
F370	I13
F371	I10
F372	I13
F373	I12

Mono board: Program memories


4
PROGRAM MEMORIES
SYSTEM DATA Bus
SYSTEM ADDRESS Bus
RAM/ROM Interface
5
(RAS1ND,RWN,BE0n_Fur,BE1n_Fur,CAS0ND,CAS1ND,CSL_Fur,CSH_Fur,CE_ROMN,RAS0ND,OEND)
VDD_MEM
2405
100n
7401
AM29LV160DT
VCC
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
A15
A16
A17
A18
A19
CE_
OE_
WE_
RESET_
BYTE_
VSS1
VSS2
DQ0
DQ1
DQ2
DQ3
DQ4
DQ5
DQ6
DQ7
DQ8
DQ9
DQ10
DQ11
DQ12
DQ13
DQ14
DQ15IA-1
RY|BY_
NC1
NC2
NC3
F451
F463
CE_ROM1N
FLASH_OEN
RWN
4450
OPTION
2452
7451
AM29LV160DT
F452
F462
CE_ROM2N
3450
10K
VDD_DRAM
2450
100n
2451
100n
2453
100n
7450
GM71V18163CJ
VCC1
VCC2
VCC3
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
NC1
NC2
NC3
IIO0
IIO1
IIO2
IIO3
IIO4
IIO5
IIO6
IIO7
IIO8
IIO9
IIO10
IIO11
IIO12
IIO13
IIO14
IIO15
RAS_
LCAS_
UCAS_
WE_
OE_
VSS1
VSS2
VSS3
F450
F464
F465
F466
F467
F468
OPTION
CE_ROMN
4451
OPTION
VCC_LVC00
3461
10K
7400-A
74LVC00AD
4453
7400-C
74LVC00AD
CE_ROM1N
4454
OPTION
7400-D
74LVC00AD
F469
7400-B
74LVC00AD
100n
2414
CE_ROM2N
5450
100MHZ
F454
VCC_LVC00
2459
1u
+3V3
5451
100MHZ
2456
100u
F455
VDD_DRAM
OPTION
5402
100MHZ
F419
VDD_MEM
2418
100u
7402
MC33464N
RESET_
IN
GND
NC
VDD_STI
OPTION
2460
470n
2461
470n
STB_CONT
3457
10K
F457
3460
4K7
7454
BC847B
3454
22K
F470
2457
10u
3456
10K
F456
3459
22K
7453
BC847B
3453
2K2
F471
F453
3452
22K
7452
BC847B
3451
100K
F459
RESETn
2454
100n
2455
100n
F461
4452
F458
3458
22K
7455
BC857B
3455
22K
F460
STB_CONTD
2458
470n
8
9
CL 06532152_078.eps
141200

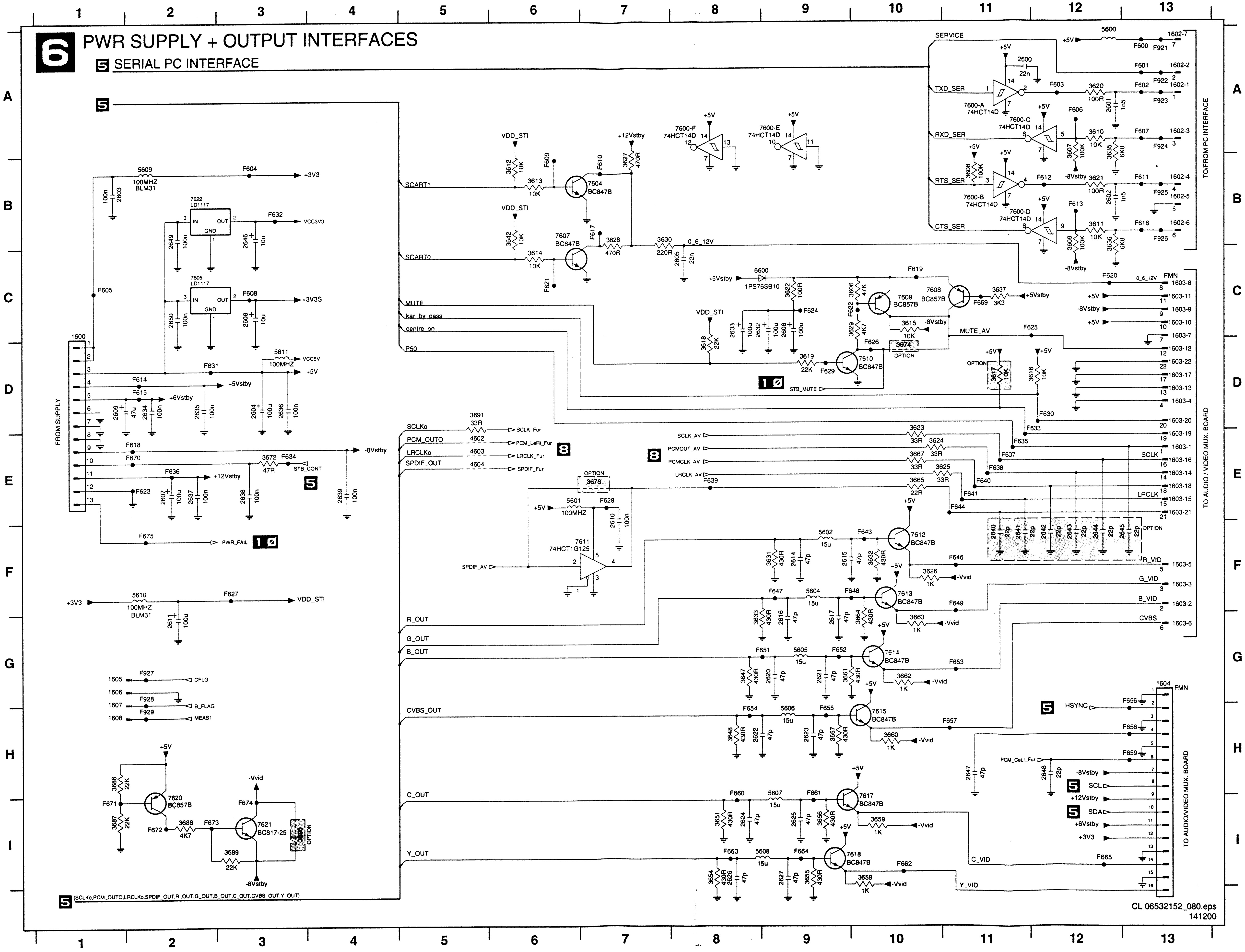
2405	B3
2414	I4
2418	I6
2450	B11
2451	B11
2452	B7
2453	B11
2454	G13
2455	G13
2456	H6
2457	I10
2458	I13
2459	H7
2460	H9
2461	H9
3450	F5
3451	G12
3452	G12
3453	H11
3454	H10
3455	I12
3456	H10
3457	I9
3458	I12
3459	I11
3460	I9
3461	G2
4450	F4
4451	G4
4452	H13
4453	H1
4454	H2
5402	I6
5450	G6
5451	H6
7400-A	G2
7400-B	I3
7400-C	H3
7400-D	I2
7401	C3
7402	G9
7450	C10
7451	C6
7452	G13
7453	H11
7454	I10
7455	I13
F419	I7
F450	E13
F451	E4
F452	E7
F453	G12
F454	G7
F455	H7
F456	H11
F457	I9
F458	I12
F459	G14
F460	I14
F461	H13
F462	F5
F463	F2
F464	E12
F465	E12
F466	E12
F467	F12
F468	F12
F469	I2
F470	H10
F471	H11

Mono board: CPU & MPEG decoder


5 CPU & MPEG DECODER
2 BASIC ENGINE INTERFACE Bus
I2C Bus
TO/FROM DISPLAY
7505 M24C32
+5Vstby
SDA
SCL
STB_CONT
P50
4 8 SYSTEM ADDRESS Bus
SYSTEM DATA Bus
RAM/ROM Interface
FRONT END
7503 STi5505
MEMORY interface
SYSTEM USE
PORT 0 I/O
PORT 1 I/O
PORT 2 I/O
PORT 3 I/O
PORT 4 I/O
JTAG
TEST
IRQ
uP ST20cpu
AC3
LPCM
MPEG1/2
AUDIO DECODER
A/V/Sub demultiplexer
Audio
Video
Subpicture
MPEG DECODER
Subpicture decoder
VIDEO ENCODER
FRONT-END Interface
I2S
SDRAM CONTROLLER
ADDRESS
DATA
7 SDRAM Interface
PCM-OUT1
VDDA_PCM
VSSA_PCM
VREF_PCM
TXD_SER
SERVICE
CTS_SER
RTS_SER
RXD_SER
TCK
ST_TDI
TDO
TMS
TRST
SCLKo
PCM_OUTO
PCM_CLK_ST
LRCLKo
SPDIF_OUT
R_OUT
G_OUT
B_OUT
C_OUT
CVBS_OUT
Y_OUT
27M_CLK
VDD_STI
CL 06532152_079.eps
141200

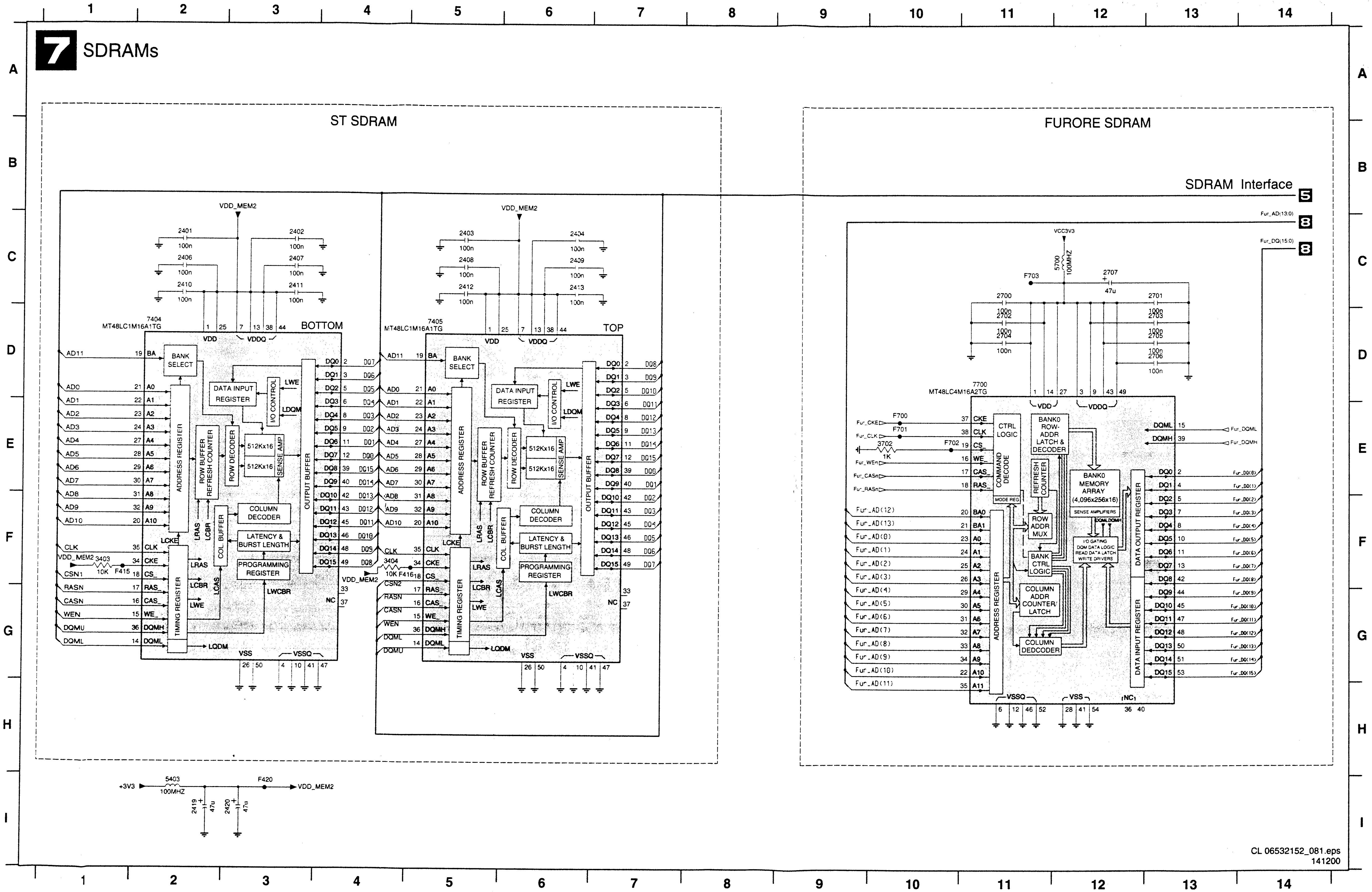
1501-1	A1
1501-2	B1
1501-3	B1
1501-4	B1
1501-5	B1
2500	A3
2504	C11
2505	B12
2506	D14
2507	D14
2508	E14
2509	E14
2510	H3
2511	H3
2512	H4
2513	H4
2514	H4
2515	H4
2516	H5
2517	H5
2518	H5
2519	H9
2520	H9
2521	H9
2522	H10
2523	H10
2524	H10
2525	H11
2526	H11
2528	I11
2529	I11
2530	I11
2531	I11
2532	A1
2533	A1
2534	B1
2535	B1
3500	B4
3501	B4
3502	B9
3503	B11
3504	A11
3505	A11
3506	B9
3507	F14
3508	B11
3509	B11
3511	C6
3512	C6
3513	A10
3514	C6
3515	C6
3516	C6
3517	C12
3519	C9
3520	C11
3521	C12
3522	C12
3523	C12
3524	D14
3525	E14
3526	F2
3534	I12
3535	I13
3537	I12
3538	I13
3540	C9
3541	B7
3542	B8
3545	D14
3546	C7
3547	B6
3548	A10
3550	B10
3551	B10
3553	A11
3562	C7
3563	C7
3564	C8
3566	C7
3568	C8
3570	F14
3571	A2
3572	B2
4500	A9
4501	A9
4502	B7
4503	C8
4504	C10
4505	C6
4506	C7
4507	B10
5501	I11
5502	I12
5503	A1
5504	B1
7503	D2
7505	A3
F501	A11
F502	C7
F503	I13
F504	C7
F505	C12
F506	D14
F507	F14
F508	C7
F509	C8
F511	A1
F512	B1
F513	B11
F514	B8
F515	B1
F516	B1
F517	B11
F518	B6
F519	A9
F520	C8
F521	C10
F522	C11
F524	C10
F525	C11
F526	C7
F527	C7
F528	C11
F529	C8
F530	C10
F531	C10
F532	C10
F533	C10
F534	C10
F535	C5
F536	C6
F537	C11
F538	C6
F539	C7
F540	C6
F541	C12
F542	C9
F543	C7
F544	C9
F545	C9
F546	C9
F547	C9
F548	C9
F549	C9
F552	C7
F553	C8
F554	C8
F555	C6
F556	C12
F557	C12
F558	D14
F559	E14
F560	E14
F562	E14
F564	E14
F566	F14
F567	F14
F568	F2
F569	F13
F573	F14
F574	G14
F576	G14
F578	G2
F579	G2
F580	G2
F581	G2
F582	G2
F583	G2
F585	H11
F586	H11
F587	H13
F588	H12
F589	H12
F590	H13
F592	I8
F593	I8
F594	I8
F595	I8
F596	I8
F597	I8
F598	I8
F599	I8

Mono board: Power supply & output interfaces


6
PWR SUPPLY + OUTPUT INTERFACES
5 SERIAL PC INTERFACE
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I
SERVICE
TXD_SER
RXD_SER
RTS_SER
CTS_SER
7600-A 74HCT14D
7600-B 74HCT14D
7600-C 74HCT14D
7600-D 74HCT14D
7600-E 74HCT14D
7600-F 74HCT14D
5600
2600 22n
3620 100R
3621 100R
3610 10K
3611 10K
3607 100K
3608 100K
3609 100K
3635 6K8
3636 6K8
2601 1n5
2602 1n5
1602-1
1602-2
1602-3
1602-4
1602-5
1602-6
1602-7
TO/FROM PC INTERFACE
SCART1
SCART0
VDD_STI
+12Vstby
7604 BC847B
7607 BC847B
3612 10K
3613 10K
3614 10K
3642 10K
3627 470R
3628 470R
3630 220R
2605 22n
0_6_12V
5609 100MHZ BLM31
+3V3
7622 LD1117
7605 LD1117
VCC3V3
+3V3S
5611 100MHZ
VCC5V
+5V
+5Vstby
+6Vstby
-8Vstby
+12Vstby
STB_CONT
PWR_FAIL
FROM SUPPLY
1600
MUTE
kar_by_pass
centre_on
P50
6600 1PS76SB10
7608 BC857B
7609 BC857B
7610 BC847B
3637 3K3
3615 10K
3674 OPTION
3619 22K
3618 22K
STB_MUTE
MUTE_AV
FMN
1603-1 … 1603-22
SCLKo
PCM_OUTO
LRCLKo
SPDIF_OUT
3691 33R
4602
4603
4604
SCLK_Fur
PCM_LeRi_Fur
LRCLK_Fur
SPDIF_Fur
SCLK_AV
PCMOUT_AV
PCMCLK_AV
LRCLK_AV
3623 33R
3624 33R
3667 33R
3625 33R
3665 22R
SCLK
LRCLK
3676 OPTION
5601 100MHZ
7611 74HCT1G125
SPDIF_AV
2640 22p 2641 22p 2642 22p 2643 22p 2644 22p 2645 22p OPTION
7612 BC847B
7613 BC847B
7614 BC847B
7615 BC847B
7617 BC847B
7618 BC847B
5602 15u
5604 15u
5605 15u
5606 15u
5607 15u
5608 15u
-Vvid
R_VID
G_VID
B_VID
CVBS
C_VID
Y_VID
R_OUT
G_OUT
B_OUT
CVBS_OUT
C_OUT
Y_OUT
TO AUDIO / VIDEO MUX. BOARD
5610 100MHZ BLM31
VDD_STI
1605 CFLG
1606
1607 B_FLAG
1608 MEAS1
F927 F928 F929
7620 BC857B
7621 BC817-25
3686 22K
3687 22K
3688 4K7
3689 22K
3690 OPTION
-Vvid
-8Vstby
1604
HSYNC
PCM_CeLf_Fur
SCL
SDA
+3V3
TO AUDIO/VIDEO MUX. BOARD
5 (SCLKo,PCM_OUTO,LRCLKo,SPDIF_OUT,R_OUT,G_OUT,B_OUT,C_OUT,CVBS_OUT,Y_OUT)
CL 06532152_080.eps
141200

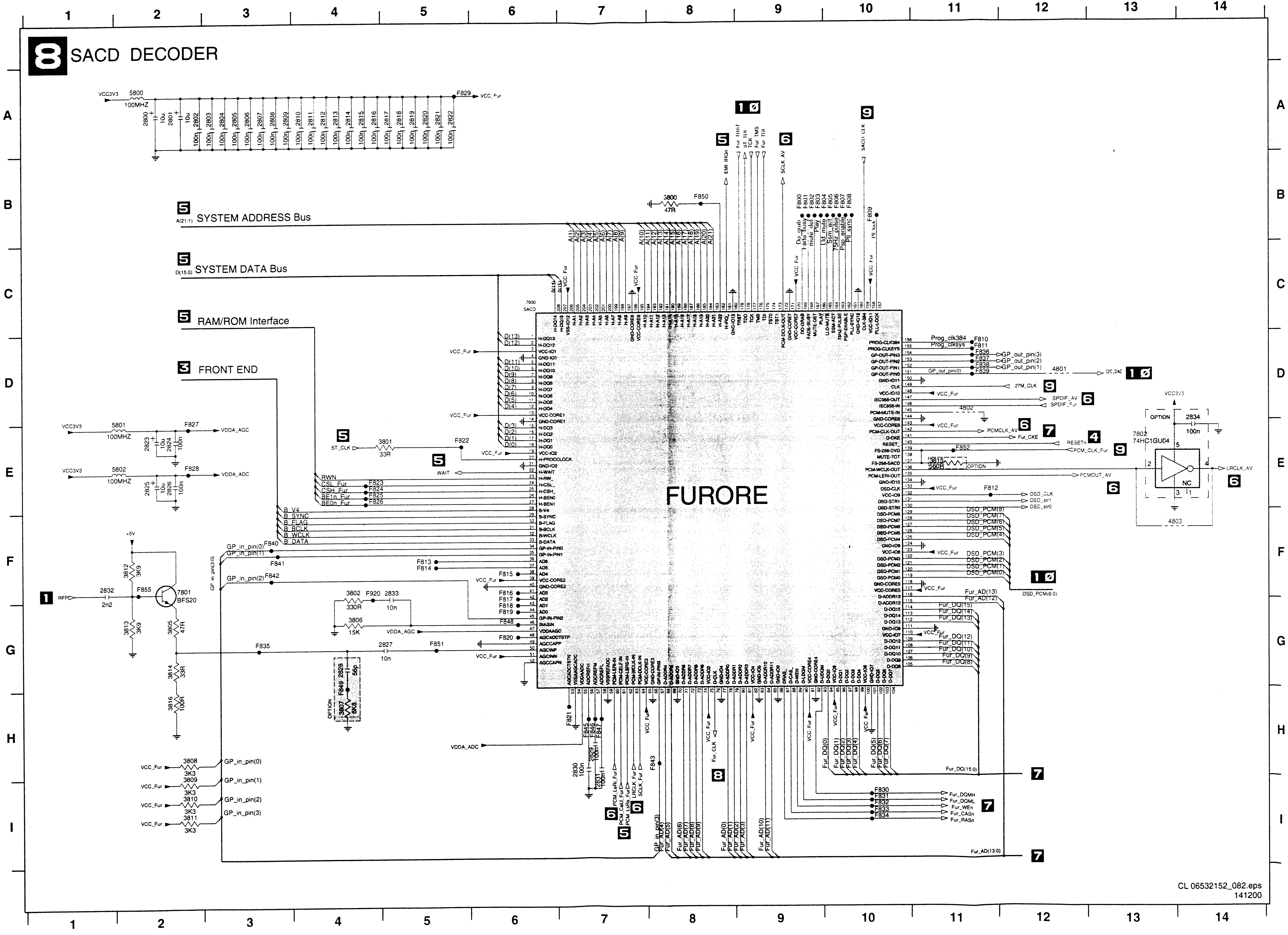
1600	C1	3658	I10	F665	I12
1602-1	A13	3659	I10	F669	C11
1602-2	A13	3660	H10	F670	E2
1602-3	A13	3661	G9	F671	I1
1602-4	B13	3662	G10	F672	I2
1602-5	B13	3663	G10	F673	I2
1602-6	B13	3664	G10	F674	I3
1602-7	A13	3665	E10	F675	F2
1603-1	E13	3667	E10	F921	A13
1603-10	C13	3672	E3	F922	A13
1603-11	C13	3674	D10	F923	A13
1603-12	D13	3676	E7	F924	A13
1603-13	D13	3686	H1	F925	B13
1603-14	E13	3687	I1	F926	B13
1603-15	E13	3688	I2	F927	G2
1603-16	E13	3689	I3	F928	G2
1603-17	D13	3690	I3	F929	H2
1603-18	E13	3691	D5		
1603-19	E13	4602	E5		
1603-2	F13	4603	E5		
1603-20	D13	4604	E5		
1603-21	E13	5600	A12		
1603-22	D13	5601	E6		
1603-3	F13	5602	F9		
1603-4	D13	5604	F9		
1603-5	F13	5605	G9		
1603-6	G13	5606	H9		
1603-7	D13	5607	I9		
1603-8	C13	5608	I9		
1603-9	C13	5609	B2		
1604	G13	5610	F2		
1605	G1	5611	D3		
1606	G1	6600	C9		
1607	G1	7600-A	A11		
1608	H1	7600-B	B11		
2600	A11	7600-C	A11		
2601	A12	7600-D	B11		
2602	B12	7600-E	A9		
2603	B1	7600-F	A8		
2604	D3	7604	B7		
2605	C8	7605	C2		
2606	C9	7607	B6		
2607	E2	7608	C10		
2608	C3	7609	C10		
2609	D1	7610	D10		
2610	E7	7611	F6		
2611	G2	7612	F10		
2614	F9	7613	F10		
2615	F9	7614	G10		
2616	G9	7615	H10		
2617	G9	7617	I10		
2620	G9	7618	I9		
2621	G9	7620	H2		
2622	H8	7621	I3		
2623	H9	7622	B2		
2624	I8	F600	A13		
2625	I9	F601	A13		
2626	I8	F602	A13		
2627	I9	F603	A12		
2632	C8	F604	B3		
2633	C8	F605	C1		
2634	D2	F606	A12		
2635	D2	F607	A13		
2636	D3	F608	C3		
2637	E2	F609	B6		
2638	E3	F610	B7		
2639	E4	F611	B13		
2640	F11	F612	B12		
2641	F11	F613	B12		
2642	F12	F614	D2		
2643	F12	F615	D2		
2644	F12	F616	B13		
2645	F13	F617	B7		
2646	B3	F618	E2		
2647	H11	F619	C10		
2648	H12	F620	C12		
2649	B2	F621	C6		
2650	C2	F622	C10		
3606	C10	F623	E2		
3607	A12	F624	C9		
3608	B11	F625	C12		
3609	B12	F626	D10		
3610	A12	F627	F3		
3611	B12	F628	E7		
3612	B6	F629	D9		
3613	B6	F630	D12		
3614	C6	F631	D2		
3615	C10	F632	B3		
3616	D12	F633	E12		
3617	D11	F634	E3		
3618	D8	F635	E11		
3619	D9	F636	E2		
3620	A12	F637	E11		
3621	B12	F638	E11		
3622	C9	F639	E8		
3623	E10	F640	E11		
3624	E10	F641	E11		
3625	E11	F643	F10		
3626	F10	F644	E11		
3627	B7	F646	F11		
3628	B7	F647	F9		
3629	C10	F648	F10		
3630	B7	F649	F11		
3631	F9	F651	G9		
3632	F10	F652	G9		
3633	G8	F653	G11		
3635	A12	F654	H8		
3636	B12	F655	H9		
3637	C11	F656	H13		
3642	B6	F657	H11		
3647	G8	F658	H13		
3648	H8	F659	H13		
3651	I8	F660	I8		
3654	I8	F661	I9		
3655	I9	F662	I10		
3656	I9	F663	I8		
3657	H9	F664	I9		

Mono board: SD RAM's


7
SDRAMs
ST SDRAM
FURORE SDRAM
SDRAM Interface
5
8
8
Fur_AD(13:0)
Fur_DQ(15:0)
VDD_MEM2
2401
2402
2403
2404
2406
2407
2408
2409
2410
2411
2412
2413
100n
7404
MT48LC1M16A1TG
BOTTOM
7405
MT48LC1M16A1TG
TOP
VDD
VDDQ
BANK SELECT
DATA INPUT REGISTER
I/O CONTROL
LWE
LDQM
ADDRESS REGISTER
ROW BUFFER REFRESH COUNTER
ROW DECODER
512Kx16
SENSE AMP
OUTPUT BUFFER
COLUMN DECODER
LATENCY & BURST LENGTH
PROGRAMMING REGISTER
COL. BUFFER
TIMING REGISTER
LCKE
LRAS
LCBR
LCAS
LWCBR
LDQM
NC
VSS
VSSQ
AD11
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
AD8
AD9
AD10
CLK
CSN1
CSN2
RASN
CASN
WEN
DQMU
DQML
3403
10K
F415
3404
F416
D00
D01
D02
D03
D04
D05
D06
D07
D08
D09
D010
D011
D012
D013
D014
D015
VCC3V3
5700
100MHZ
F703
2707
47u
2700
2701
2702
2703
2704
2705
2706
7700
MT48LC4M16A2TG
F700
F701
F702
3702
1K
Fur_CKE
Fur_CLK
Fur_WEn
Fur_CASn
Fur_RASn
Fur_AD(0) … Fur_AD(13)
CTRL LOGIC
COMMAND DECODE
MODE REG
REFRESH COUNTER
BANK0 ROW-ADDR LATCH & DECODER
BANK0 MEMORY ARRAY (4,096x256x16)
SENSE AMPLIFIERS
ROW ADDR MUX
BANK CTRL LOGIC
I/O GATING DQM DATA LOGIC READ DATA LATCH WRITE DRIVERS
COLUMN ADDR COUNTER/ LATCH
COLUMN DEDCODER
DATA OUTPUT REGISTER
DATA INPUT REGISTER
DQML
DQMH
Fur_DQML
Fur_DQMH
Fur_DQ(0) … Fur_DQ(15)
VSSQ
VSS
NC
+3V3
5403
100MHZ
F420
2419
2420
47u
CL 06532152_081.eps
141200

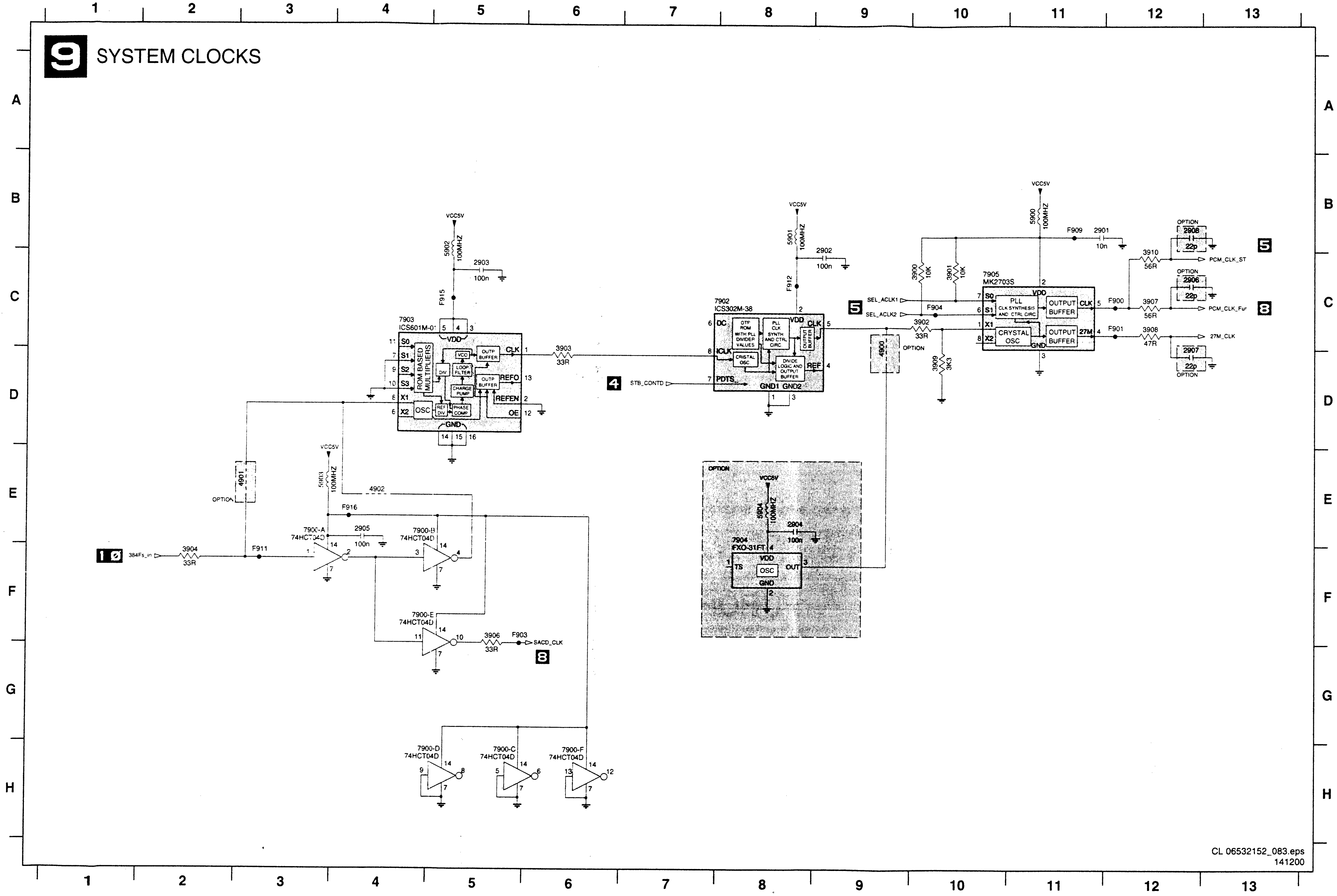
2401	C2
2402	C3
2403	C5
2404	C6
2406	C2
2407	C3
2408	C5
2409	C6
2410	C2
2411	C3
2412	C5
2413	C6
2419	I2
2420	I3
2700	C11
2701	C13
2702	D11
2703	D13
2704	D11
2705	D13
2706	D13
2707	C12
3403	F1
3404	F4
3702	E10
5403	I2
5700	C12
7404	D2
7405	D5
7700	D11
F415	F1
F416	F4
F420	I3
F700	E10
F701	E10
F702	E10
F703	C11

Mono board: SACD decoder


8 SACD DECODER
FURORE
7800 SACD
VCC3V3
5800 100MHZ
F829 VCC_Fur
2800 10u
2801 10u
2802 ... 2822 100n
5 SYSTEM ADDRESS Bus A(21:1)
5 SYSTEM DATA Bus D(15:0)
5 RAM/ROM Interface
3 FRONT END
5801 100MHZ
F827 VDDA_AGC
2823 10u 2824 100n
5802 100MHZ
F828 VDDA_ADC
2825 10u 2826 100n
5 ST_CLK 3801 33R F822
WAIT
RWN
CSL_Fur F823
CSH_Fur F824
BE1n_Fur F825
BE0n_Fur F826
B_V4
B_SYNC
B_FLAG
B_BCLK
B_WCLK
B_DATA
GP_in_pin(0) F840
GP_in_pin(1) F841
GP_in_pin(2) F842
F813 F814 F815 F816 F817 F818 F819 F848 F820
+5V
3812 3K9
1 RFP 2832 2n2 F855
7801 BFS20
3813 3K9
3805 47R
3814 33R
3816 100R
F835
3802 330R F920 2833 10n
3806 15K
VDDA_AGC
2827 10n F851
OPTION 3807 6K8 F849 2828 56p
VDDA_ADC
F821 F845 F846 F847
2829 100n 2830 100n 2831 100n
F843
3808 3K3 GP_in_pin(0)
3809 3K3 GP_in_pin(1)
3810 3K3 GP_in_pin(2)
3811 3K3 GP_in_pin(3)
VCC_Fur
6 PCM_LeRi_Fur PCM_CaU_Fur PCM_LeRi_Fur
6 LRCLK_Fur SCLK_Fur
5 GP_in_pin(3)
Fur_AD(4) Fur_AD(5) Fur_AD(6) Fur_AD(7) Fur_AD(8) Fur_AD(9)
Fur_AD(0) Fur_AD(1) Fur_AD(2) Fur_AD(3) Fur_AD(10) Fur_AD(11)
8 Fur_CLK
Fur_DQ(0) ... Fur_DQ(7)
Fur_DQ(15:0) 7
F830 Fur_DQMH
F831 Fur_DQML
F832 Fur_WEn
F833 Fur_CASn
F834 Fur_RASn 7
Fur_AD(13:0) 7
3800 47R F850
5 EMI IRQn
10 Fur TRST ST Fur TCK Fur TMS Fur TDI
6 SCLK AV
9 SACD CLK
F800 Do_grab
F801 Fado_busy
F802 mute_det
F803 Play
F804 Lld_mute
F805 Ssm_act
F806 75Hz_pulse
F807 Psp_enable
F808 Pll_sync
F809 Pll_lock
Prog_clk384 F810
Prog_clksys F811
F836 GP_out_pin(3)
F837 GP_out_pin(2)
F838 GP_out_pin(1)
F839 GP_out_pin(0)
4801 I2C_DAC 10
27M_CLK 9
SPDIF_AV SPDIF_Fur 6
4802
PCMCLK_AV 6
Fur_CKE 7
RESETn 4
F852 PCM_CLK_Fur 9
3815 560R OPTION
PCMOUT_AV 6
F812 DSD_CLK DSD_str1 DSD_str0
DSD_PCM(8) ... DSD_PCM(0)
DSD_PCM(8:0) 10
Fur_AD(13) Fur_AD(12)
Fur_DQ(15) ... Fur_DQ(8)
VCC3V3
OPTION 2834 100n
7802 74HC1GU04
NC
4803
LRCLK_AV 6
CL 06532152_082.eps
141200

2800	A2
2801	A2
2802	A2
2803	A3
2804	A3
2805	A3
2806	A3
2807	A3
2808	A3
2809	A3
2810	A4
2811	A4
2812	A4
2813	A4
2814	A4
2815	A4
2816	A4
2817	A5
2818	A5
2819	A5
2820	A5
2821	A5
2822	A5
2823	E2
2824	E2
2825	E2
2826	E2
2827	G5
2828	G4
2829	H7
2830	H7
2831	I7
2832	F1
2833	F5
2834	E14
3800	B8
3801	E5
3802	F4
3805	G2
3806	G4
3807	H4
3808	H2
3809	I2
3810	I2
3811	I2
3812	F2
3813	G2
3814	G2
3815	E11
3816	H2
4801	D12
4802	D11
4803	F13
5800	A2
5801	E2
5802	E2
7800	C6
7801	F2
7802	E13
F800	B9
F801	B9
F802	B9
F803	B9
F804	B10
F805	B10
F806	B10
F807	B10
F808	B10
F809	B10
F810	D11
F811	D11
F812	E11
F813	F5
F814	F5
F815	F6
F816	F6
F817	G6
F818	G6
F819	G6
F820	G6
F821	H7
F822	E5
F823	E4
F824	E4
F825	E4
F826	E4
F827	E2
F828	E2
F829	A5
F830	I10
F831	I10
F832	I10
F833	I10
F834	I10
F835	G3
F836	D11
F837	D11
F838	D11
F839	D11
F840	F3
F841	F3
F842	F3
F843	H8
F845	H7
F846	H7
F847	H7
F848	G6
F849	G4
F850	B8
F851	G5
F852	E11
F855	F2
F920	F4

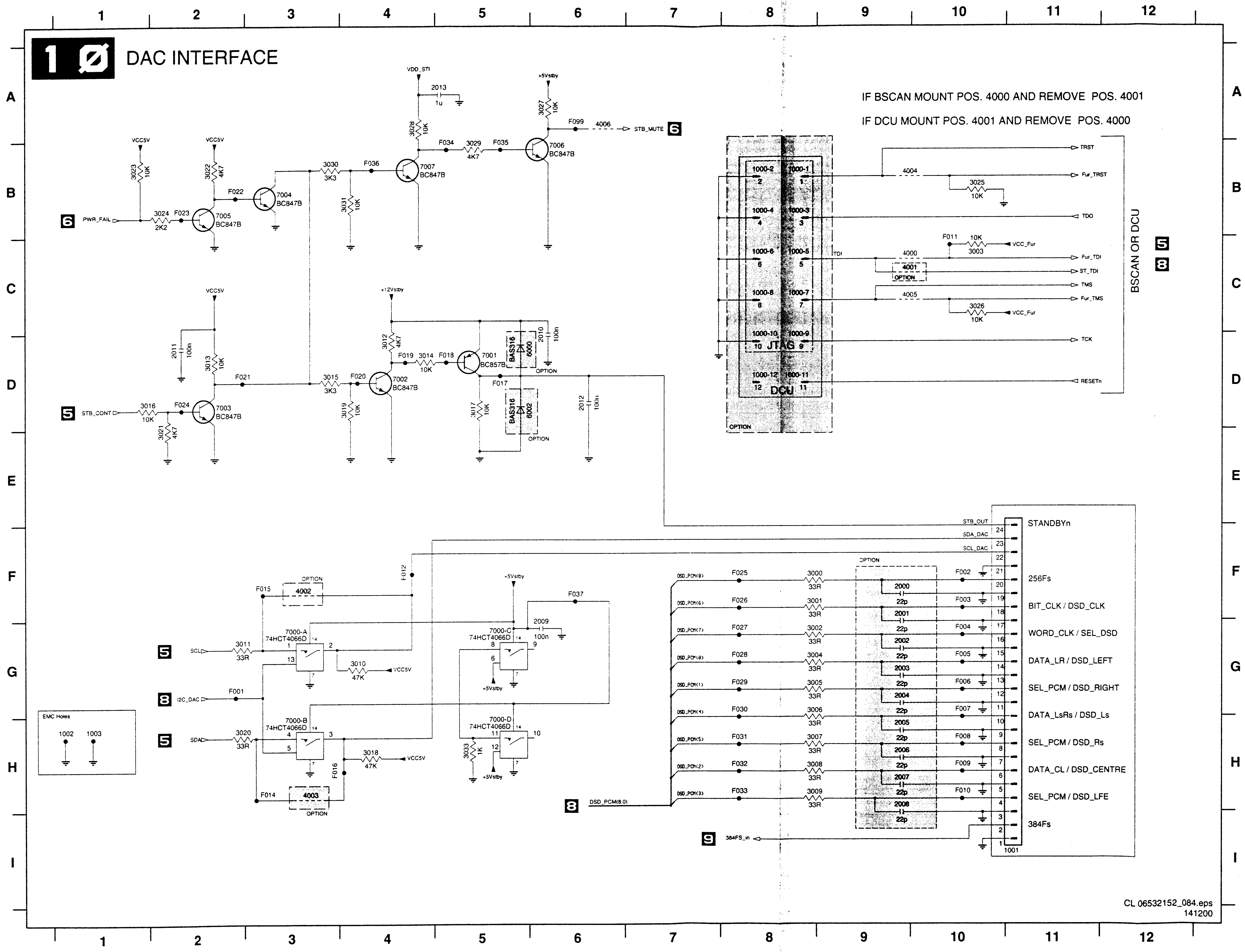
Mono board: System clocks


9 SYSTEM CLOCKS
VCC5V
5902 100MHZ
2903 100n
F915
7903 ICS601M-01
S0 S1 S2 S3 X1 X2 OSC
ROM BASED MULTIPLIERS
VDD GND
CLK REFO REFEN OE
3903 33R
7902 ICS302M-38
DC ICLK PDTS CLK REF VDD GND1 GND2
STB_CONTD
5901 100MHZ
2902 100n
F912
SEL_ACLK1
SEL_ACLK2
3900 10K
3901 10K
3902 33R
3909 3K3
F904
4900 OPTION
5900 100MHZ
F909
2901 10n
7905 MK2703S
PLL
CRYSTAL OSC
OUTPUT BUFFER
CLK 27M VDD GND
F900
F901
3910 56R
3907 56R
3908 47R
2908 22p
2906 22p
2907 22p
OPTION
PCM_CLK_ST
PCM_CLK_Fur
27M_CLK
OPTION
VCC5V
5904 100MHZ
2904 100n
7904 FXO-31FT
TS VDD OSC OUT GND
4901 OPTION
5903 100MHZ
4902
F916
2905 100n
7900-A 74HCT04D
7900-B 74HCT04D
7900-E 74HCT04D
7900-D 74HCT04D
7900-C 74HCT04D
7900-F 74HCT04D
384Fs_in
3904 33R
F911
3906 33R
F903
SACD_CLK
10
8
4
5
8
5

CL 06532152_083.eps
141200

2901	B11
2902	C9
2903	C5
2904	E8
2905	E4
2906	C12
2907	D12
2908	B12
3900	C10
3901	C10
3902	C10
3903	D6
3904	F2
3906	F5
3907	C12
3908	C12
3909	D10
3910	C12
4900	C9
4901	E3
4902	E4
5900	B11
5901	B8
5902	B5
5903	E3
5904	E8
7900-A	E3
7900-B	E4
7900-C	H5
7900-D	H4
7900-E	F4
7900-F	H6
7902	C7
7903	C4
7904	E8
7905	C10
F900	C12
F901	C12
F903	F5
F904	C10
F909	B11
F911	F3
F912	C8
F915	C5
F916	E4

Mono board: DAC interface


1 Ø DAC INTERFACE
PWR_FAIL
STB_CONT
STB_MUTE
VCC5V
VDD_STI
+5Vstby
+12Vstby
7005 BC847B
7004 BC847B
7007 BC847B
7006 BC847B
7003 BC847B
7002 BC847B
7001 BC857B
BAS316 6000
BAS316 6002
OPTION
TRST
Fur_TRST
TDO
Fur_TDI
ST_TDI
TMS
Fur_TMS
TCK
RESETn
VCC_Fur
JTAG
DCU
BSCAN OR DCU
STANDBYn
256Fs
BIT_CLK / DSD_CLK
WORD_CLK / SEL_DSD
DATA_LR / DSD_LEFT
SEL_PCM / DSD_RIGHT
DATA_LsRs / DSD_Ls
SEL_PCM / DSD_Rs
DATA_CL / DSD_CENTRE
SEL_PCM / DSD_LFE
384Fs
STB_OUT
SDA_DAC
SCL_DAC
DSD_PCM(8:0)
384FS_in
SCL
I2C_DAC
SDA
7000-A 74HCT4066D
7000-B 74HCT4066D
7000-C 74HCT4066D
7000-D 74HCT4066D
EMC Holes
1002
1003
1001

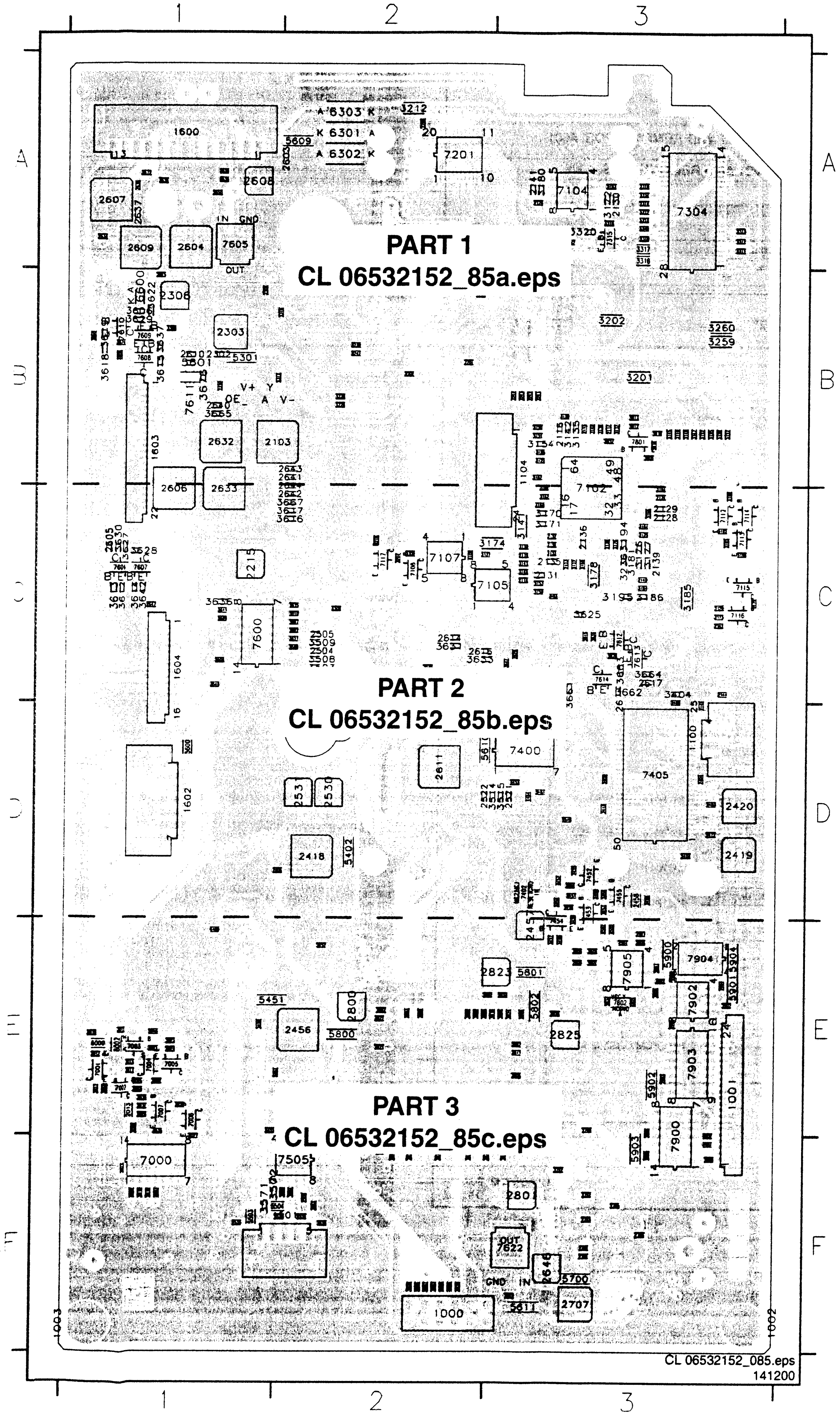
IF BSCAN MOUNT POS. 4000 AND REMOVE POS. 4001

IF DCU MOUNT POS. 4001 AND REMOVE POS. 4000

CL 06532152_084.eps
141200

1000-1	B8
1000-10	D8
1000-11	D8
1000-12	D8
1000-2	B8
1000-3	B8
1000-4	B8
1000-5	C8
1000-6	C8
1000-7	C8
1000-8	C8
1000-9	D8
1001	I10
1002	H1
1003	H1
2000	F9
2001	F9
2002	G9
2003	G9
2004	G9
2005	H9
2006	H9
2007	H9
2008	H9
2009	G6
2010	D6
2011	D2
2012	D6
2013	A5
3000	F8
3001	F8
3002	G8
3003	C10
3004	G8
3005	G8
3006	G8
3007	H8
3008	H8
3009	H8
3010	G4
3011	G2
3012	D4
3013	D2
3014	D4
3015	D3
3016	D1
3017	D5
3018	H4
3019	D4
3020	H2
3021	E2
3022	B2
3023	B1
3024	B2
3025	B10
3026	C10
3027	A6
3028	A4
3029	B5
3030	B3
3031	B4
3033	H5
4000	C9
4001	C9
4002	F3
4003	H3
4004	B9
4005	C9
4006	A6
6000	D5
6002	D5
7000-A	G3
7000-B	H3
7000-C	G5
7000-D	H5
7001	D5
7002	D4
7003	D2
7004	B3
7005	B2
7006	B6
7007	B4
F001	G2
F002	F10
F003	F10
F004	G10
F005	G10
F006	G10
F007	G10
F008	H10
F009	H10
F010	H10
F011	C10
F012	F4
F014	H3
F015	F3
F016	H3
F017	D5
F018	D5
F019	D4
F020	D4
F021	D2
F022	B2
F023	B2
F024	D2
F025	F8
F026	F8
F027	G8
F028	G8
F029	G8
F030	G8
F031	H8
F032	H8
F033	H8
F034	B5
F035	B5
F036	B4
F037	F6
F099	A6

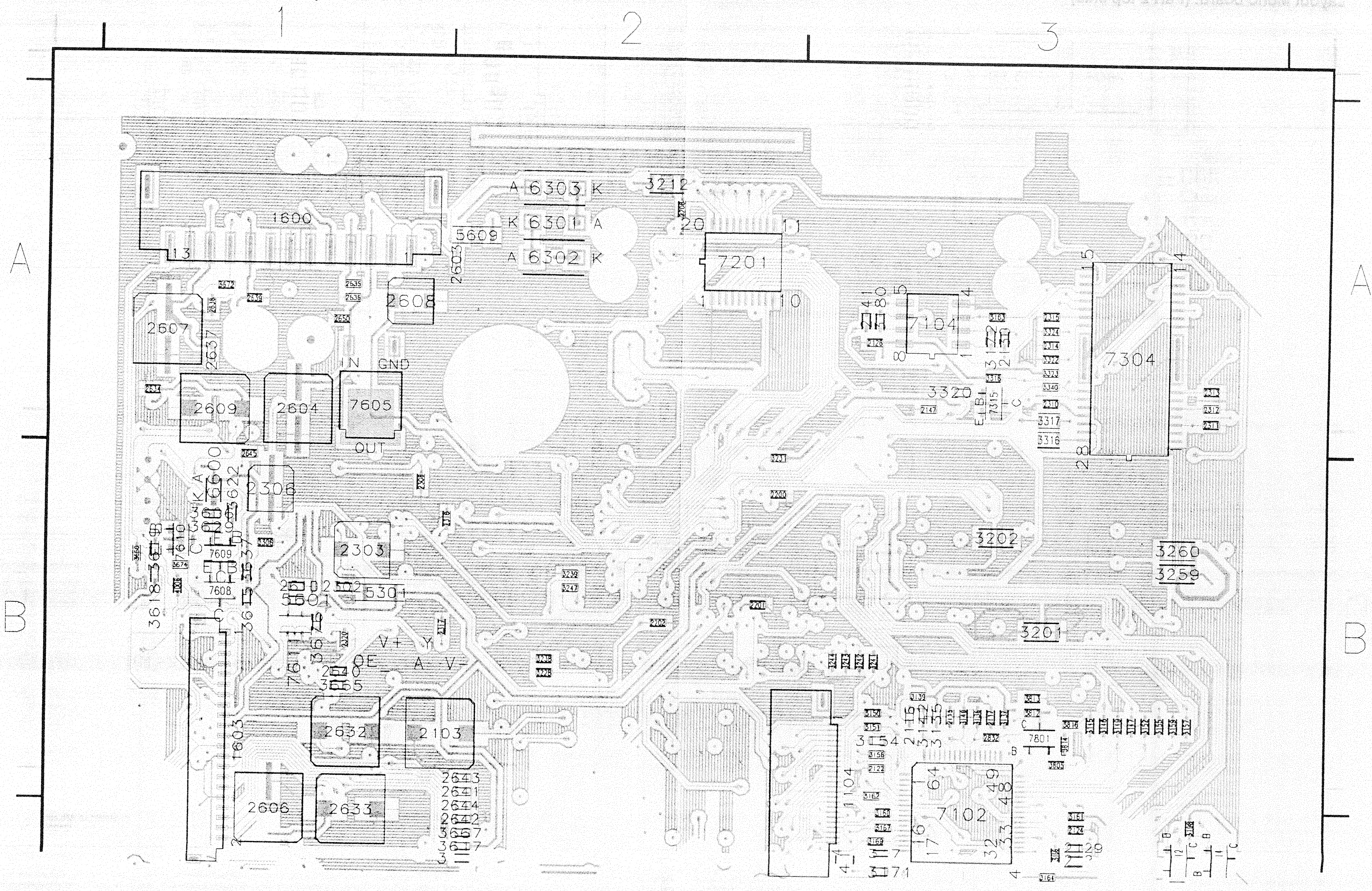
Layout Mono board: (overview top side)



CL 06532152_085.eps
141200

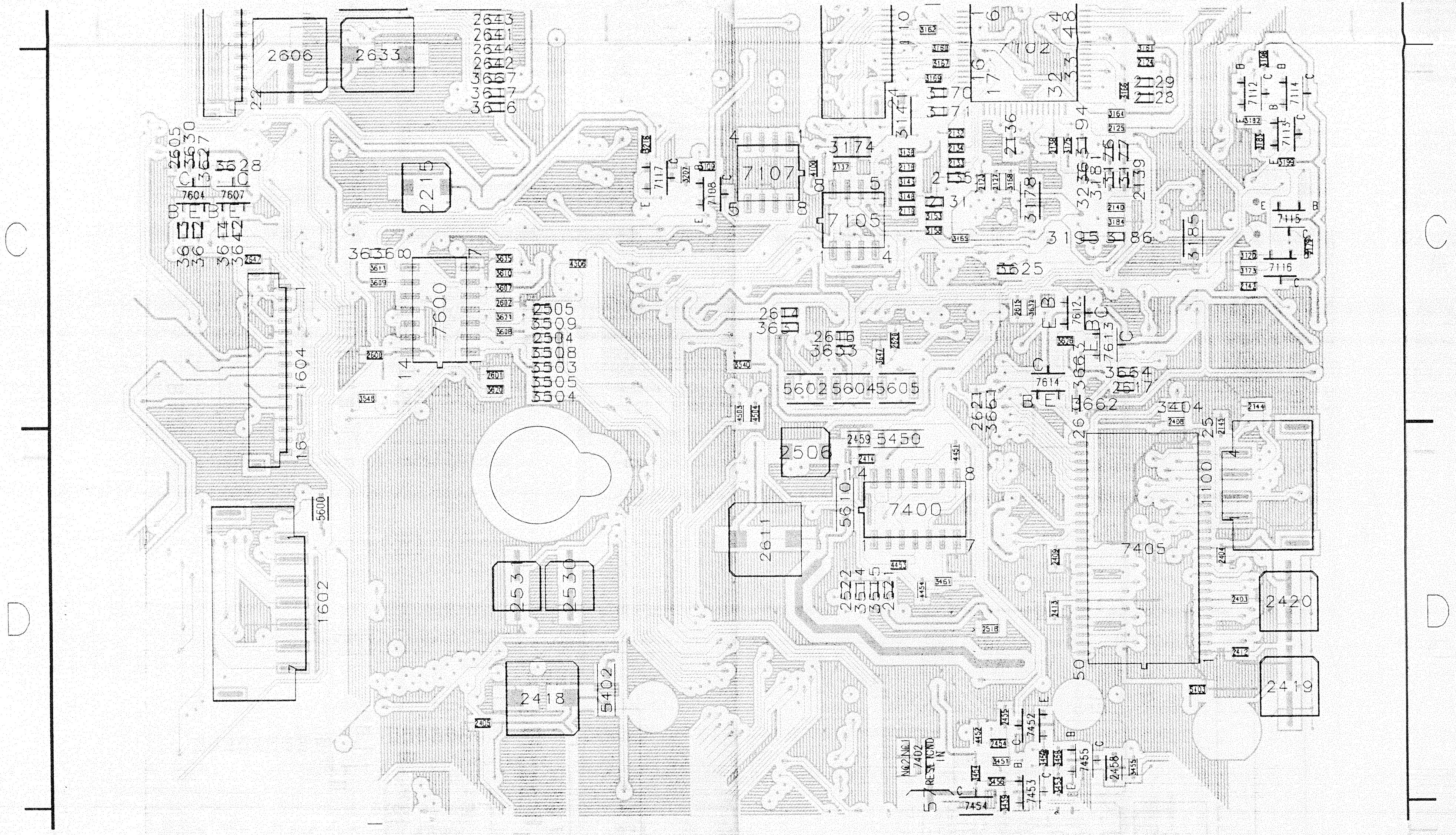
1001	E3	2642	C2	3180	A3	3910	E3
1100	D3	2643	B2	3181	C3	4000	F2
1104	B3	2644	C2	3182	C3	4001	F2
1501	F2	2645	B1	3183	C3	4002	F1
1600	A1	2646	F3	3184	C3	4003	F1
1602	D1	2647	C1	3185	C3	4004	F2
1603	B1	2649	F3	3186	C3	4005	F2
1604	C1	2650	A1	3194	C3	4006	B1
2009	E1	2700	E3	3195	C3	4100	C2
2010	E1	2701	F3	3198	C3	4450	E1
2011	E1	2702	F3	3199	C3	4451	D3
2012	E1	2703	F3	3201	B3	4452	D3
2013	E1	2704	F3	3202	B3	4453	D3
2103	B1	2705	F3	3207	C2	4454	D3
2115	B3	2706	F3	3212	A2	4500	E3
2116	B3	2707	F3	3216	C2	4501	E3
2117	B3	2800	E2	3228	B2	4502	E3
2118	C3	2801	F3	3231	B2	4503	C2
2119	C3	2802	E2	3236	C3	4504	C2
2122	B3	2803	E2	3238	B2	4506	C2
2123	C3	2804	E2	3239	B2	4604	F2
2124	C3	2805	E2	3241	B3	4803	E3
2125	C3	2806	E3	3242	B3	4900	E3
2126	A3	2807	E3	3243	B3	4901	F3
2127	C3	2808	E3	3244	B3	4902	E3
2128	C3	2809	E3	3247	B2	5301	B1
2129	C3	2810	E3	3259	B3	5402	D2
2130	A3	2811	F3	3260	B3	5403	D3
2131	C3	2812	F3	3306	B1	5450	D3
2132	C3	2813	F3	3316	A3	5451	E1
2133	C3	2814	F3	3317	A3	5503	F1
2134	C3	2815	F2	3318	A3	5504	F2
2135	C3	2816	F2	3320	A3	5500	D1
2136	C3	2817	F2	3322	A3	5601	B1
2137	C2	2818	F2	3323	A3	5602	C2
2138	C3	2819	F2	3324	A3	5604	C3
2139	C3	2820	E2	3340	A3	5605	C3
2140	C3	2821	E2	3404	C3	5609	A2
2141	A3	2822	E2	3451	D3	5610	D2
2142	C3	2823	E3	3452	D3	5611	F3
2144	C3	2824	E3	3453	D3	5700	F3
2145	D3	2825	E3	3454	D3	5800	E2
2147	A3	2826	E3	3455	D3	5801	E3
2200	B2	2832	B3	3456	D3	5802	E3
2201	B2	2833	E3	3457	E3	5900	E3
2202	B2	2834	E3	3458	D3	5901	E3
2208	A2	2901	E3	3459	E3	5902	E3
2215	C1	2902	E3	3460	E3	5903	F3
2302	B1	2903	E3	3461	D3	5904	E3
2303	B1	2904	E3	3500	F2	6000	E1
2306	B1	2905	F3	3501	F2	6002	E1
2308	B1	2906	E3	3503	C2	6301	A2
2310	A3	2907	E3	3504	C2	6302	A2
2311	A3	2908	E3	3505	C2	6303	A2
2312	A3	3003	F2	3508	C2	6600	B1
2313	A3	3010	F1	3509	C2	7000	F1
2314	A3	3011	F1	3514	D3	7001	E1
2315	A3	3012	E1	3515	D3	7002	E1
2316	B1	3013	E1	3540	C2	7003	E1
2317	B1	3014	E1	3548	C1	7004	E1
2320	B1	3015	E1	3553	F2	7005	E1
2403	D3	3016	E1	3571	F1	7006	E1
2404	D3	3017	E1	3572	F2	7007	E1
2405	D2	3018	F1	3606	B1	7102	C3
2408	C3	3019	E1	3607	C2	7104	A3
2409	D3	3021	E1	3608	C2	7105	C3
2412	D3	3022	E1	3609	C1	7107	C2
2413	D3	3023	E1	3610	C2	7108	C2
2414	D3	3024	E1	3611	C1	7112	C3
2418	D2	3025	F2	3612	C1	7113	C3
2419	D3	3026	F2	3613	C1	7114	C3
2420	D3	3027	F1	3614	C1	7115	C3
2450	E1	3028	E1	3615	B1	7116	C3
2451	E2	3029	E1	3616	C2	7117	C2
2452	E2	3030	E1	3617	C2	7201	A2
2453	E1	3031	E1	3618	B1	7304	A3
2454	D3	3033	E1	3619	B1	7315	A3
2455	D3	3109	C2	3620	C2	7400	D3
2456	E2	3120	C3	3621	C2	7402	D3
2457	E3	3135	B3	3622	B1	7405	D3
2458	D3	3136	B3	3625	C3	7452	D3
2459	D3	3137	B3	3626	C3	7453	D3
2500	F2	3138	C3	3627	C1	7454	E3
2504	C2	3139	B3	3628	C1	7455	D3
2505	C2	3140	B3	3629	B1	7505	F2
2506	D2	3141	C3	3630	C1	7600	C1
2518	D3	3142	B3	3631	C2	7604	C1
2521	D3	3143	C3	3632	C3	7605	A1
2522	D2	3145	B3	3633	C2	7607	C1
2530	D2	3146	B3	3635	C2	7608	B1
2531	D2	3147	B3	3636	C1	7609	B1
2532	F2	3148	C3	3637	B1	7610	B1
2533	F1	3149	B3	3642	C1	7611	B1
2534	F2	3150	B3	3647	C3	7612	C3
2535	F2	3151	B3	3660	B1	7613	C3
2600	C1	3152	B3	3661	C3	7614	C3
2601	C2	3153	C3	3662	C3	7622	F3
2602	C2	3154	B3	3663	C3	7801	B3
2603	A2	3155	B3	3664	C3	7802	E3
2604	A1	3156	B3	3665	B1	7900	F3
2605	C1	3157	B3	3667	C2	7902	E3
2606	C1	3158	C3	3672	A1	7903	E3
2607	A1	3159	B3	3674	B1	7904	E3
2608	A1	3160	C3	3676	B1	7905	E3
2609	A1	3161	C3	3702	F3		
2610	B1	3162	B3	3802	E3		
2611	D2	3163	A3	3805	B3		
2614	C2	3164	C3	3806	E3		
2615	C3	3165	C3	3808	E2		
2616	C2	3166	C3	3809	E2		
2617	C3	3167	C3	3810	E3		
2620	C3	3168	C3	3811	E3		
2621	C3	3169	C3	3812	B3		
2632	B1	3170	C3	3813	B3		
2633	C1	3171	C3	3814	B3		
2634	A1	3172	A3	3816	B3		
2635	A1	3173	C3	3902	E3		
2636	A1	3174	C3	3903	E3		
2637	A1	3175	C3	3904	F3		
2638	A1	3176	C3	3906	E3		
2639	A1	3177	C3	3907	E3		
2640	B1	3178	C3	3908	E3		
2641	B2	3179	C3	3909	E3		

Layout Mono board: (Part 1 top side)


1
2
3
A
B
1600
13
1
5609
2603
6303
6301
6302
A
K
3212
20
11
7201
1
10
2607
2637
2608
2609
2604
7605
IN
GND
OUT
2306
2303
5301
7609
7608
7610
7104
3320
7315
7304
3317
3316
3202
3260
3259
3201
2632
2103
2606
2633
2643
2641
2644
2642
3657
3617
1603
1104
7102
7801
64
49
48
16
17
32
33
V+
Y
A
V-
3618
3622
6600

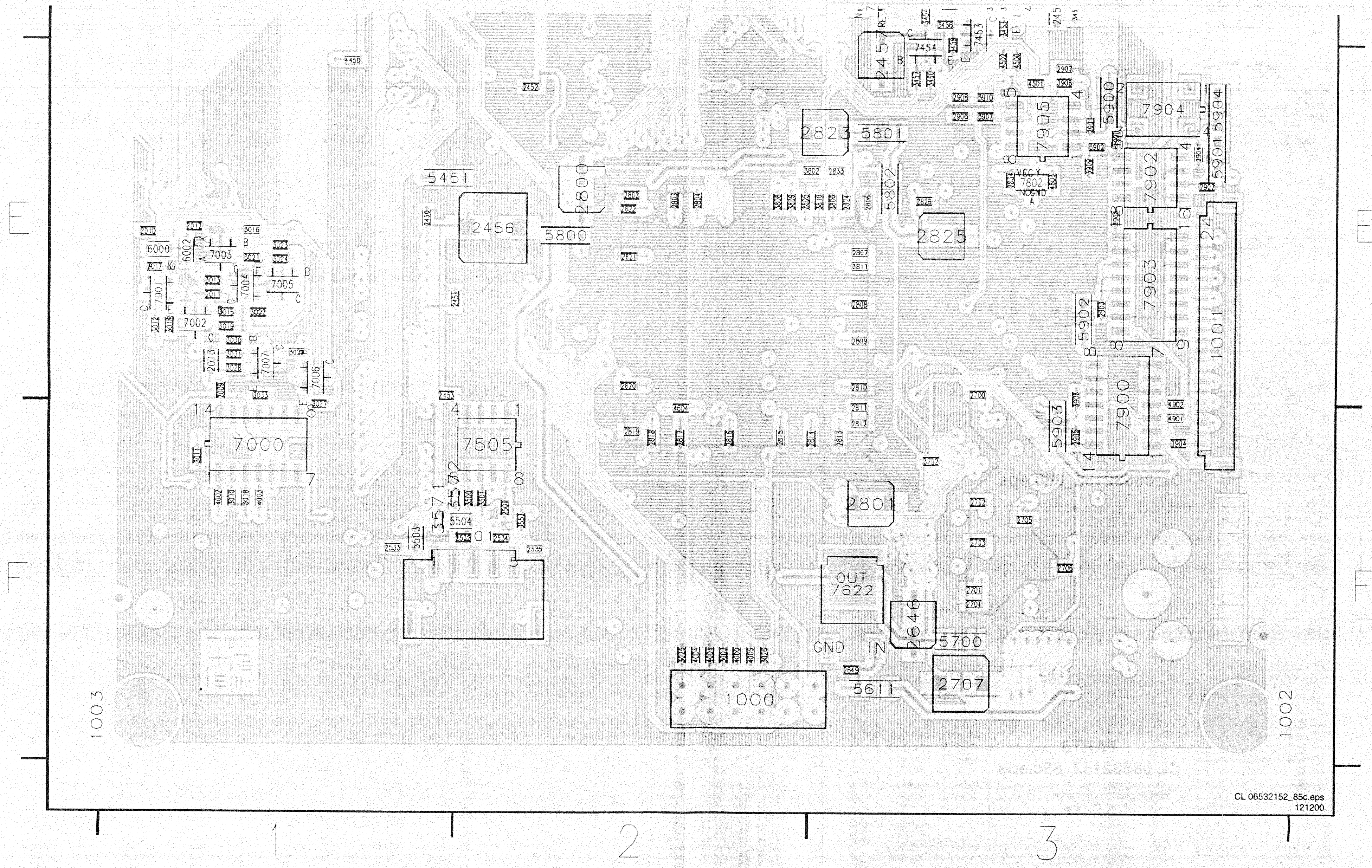
CL 06532152_85a.eps
121200

Layout Mono board: (Part 2 top side)


C
D
C
D
2606
2633
2643
2641
2644
2642
2215
1604
1602
5600
7600
7604
7607
2505
3509
2504
3508
3503
3505
3504
2531
2530
2418
5402
7107
7105
3174
3625
7102
2136
3178
3195
3186
3185
7112
7114
7115
7116
7117
7108
7613
7614
7612
3662
3404
5602
5604
5605
2506
5450
2459
5610
7400
2611
7405
2420
2419
7452
7453
7454
7455
7402
RESET GND IN

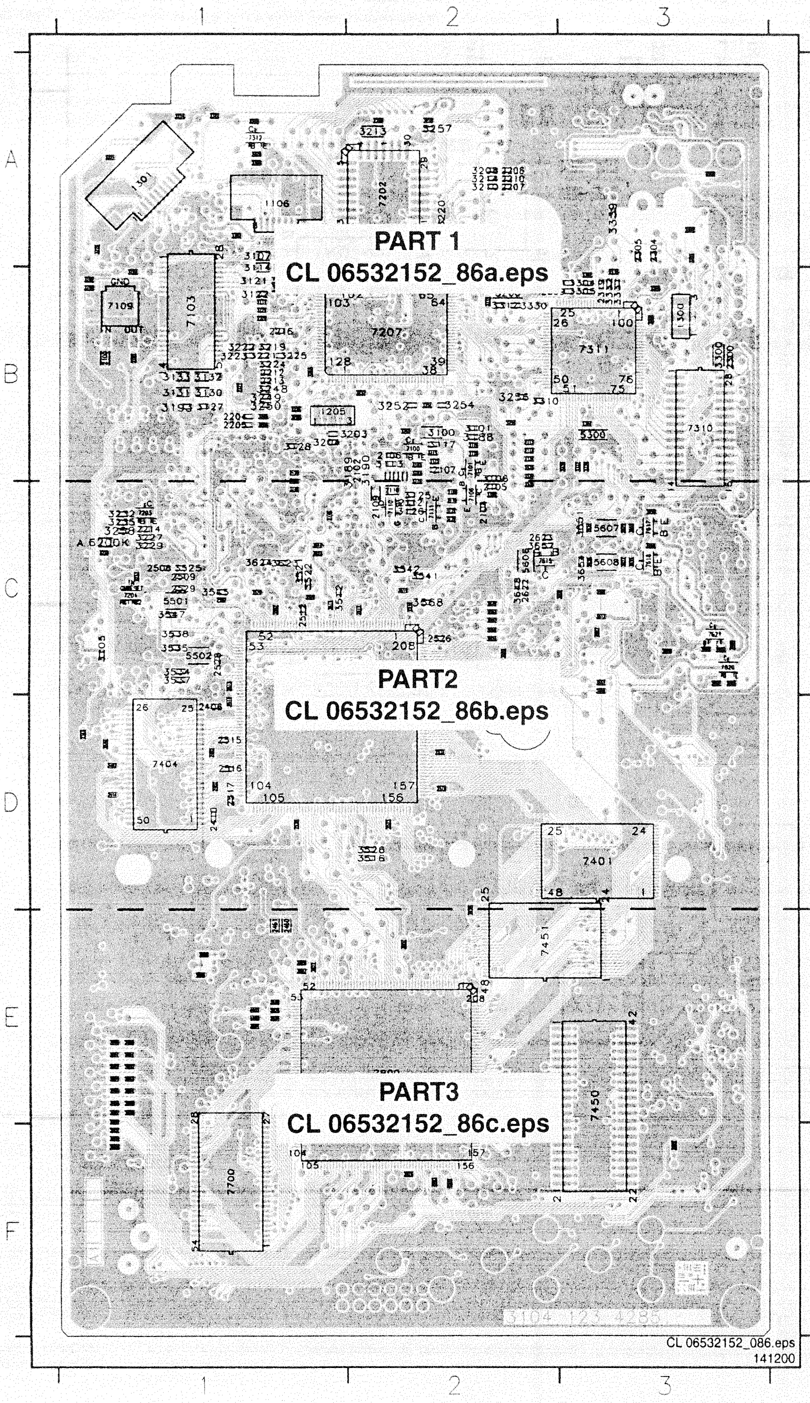
CI 06532152_85b.eps
121200

Layout Mono board: (Part 3 top side)


4450
2452
5451
2456
5800
2800
2823
5801
2802
2833
5802
2825
2457
7454
7453
7905
7904
5900
5904
5901
7902
7903
5902
1001
7900
5903
7802
6000
6002
7003
7001
7004
7005
7002
2013
7007
7006
7000
7505
5504
5503
2533
2535
2801
OUT
7622
2646
5700
2707
5611
1000
GND
IN
1003
1002
E
F
1
2
3

CL 06532152_85c.eps
121200

Layout Mono board: (overview bottom side)



CL 06532152_086.eps
141200

1106	A1
1205	B1
1300	B3
1301	A1
2000	E1
2001	E1
2002	E1
2003	E1
2004	E1
2005	E1
2006	E1
2007	F1
2008	F1
2100	B1
2101	B1
2102	B2
2104	C2
2105	C2
2106	B2
2107	B2
2108	C2
2109	C2
2110	C2
2111	B1
2112	C2
2113	B2
2114	B2
2120	B1
2121	C1
2143	D1
2146	C1
2203	B2
2204	B1
2205	B1
2206	A2
2207	A2
2209	A2
2210	A2
2212	B1
2213	B1
2214	C1
2216	B1
2226	B1
2227	B1
2228	B1
2300	B3
2301	B3
2304	A3
2305	A3
2307	B3
2309	B2
2318	B3
2319	B3
2401	D1
2402	D1
2406	D1
2407	D1
2410	D1
2411	D1
2460	E1
2461	E1
2507	C1
2508	C1
2509	C1
2510	C2
2511	C2
2512	C1
2513	C1
2514	D1
2515	D1
2516	D1
2517	D1
2519	D2
2520	D1
2523	D2
2524	D2
2525	D2
2526	C2
2528	C1
2529	C1
2622	C2
2623	C2
2624	C3
2625	C3
2626	C3
2627	C3
2648	C3
2827	E1
2828	E1
2829	E1
2830	E1
2831	E1
3000	E1
3001	E1
3002	E1
3004	E1
3005	E1
3006	E1
3007	E1
3008	E1
3009	F1
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3101	B2
3102	B2
3103	B2
3104	C2
3105	C1
3106	B2
3107	A1
3108	A1
3110	B2
3111	B2
3112	B2
3113	B2
3114	B1
3115	B1
3116	C2
3117	B2
3118	B2
3119	C2
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3122	B1
3123	C2
3124	B1
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3126	C2
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3128	B1
3129	C2
3130	B1
3131	B1
3132	B1
3133	B1
3134	B2
3144	C1
3187	A1
3188	B2
3189	B2
3190	B2
3191	B1
3192	B1
3193	B1
3196	B1
3197	B1
3200	B1
3203	B2
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3304	B3
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3311	B2
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3512	C1
3513	C3
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3517	C1
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3521	C1
3522	C1
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3524	C2
3525	C1
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3547	C1
3550	C3
3551	C3
3562	C2
3563	C2
3564	C3
3566	C2
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3570	C1
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3624	C1
3648	C2
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3655	C3
3656	C3
3657	C2
3658	C3
3659	C3
3686	C3
3687	C3
3688	C3
3689	C3
3690	C3
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3800	E2
3801	E2
3807	F1
3815	F2
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3901	E1
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7109	B1
7110	C2
7111	C2
7202	A2
7203	C1
7204	C1
7207	B2
7310	B3
7311	B3
7312	A1
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7404	D1
7450	E3
7451	E2
7503	D1
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7618	C3
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7621	C3
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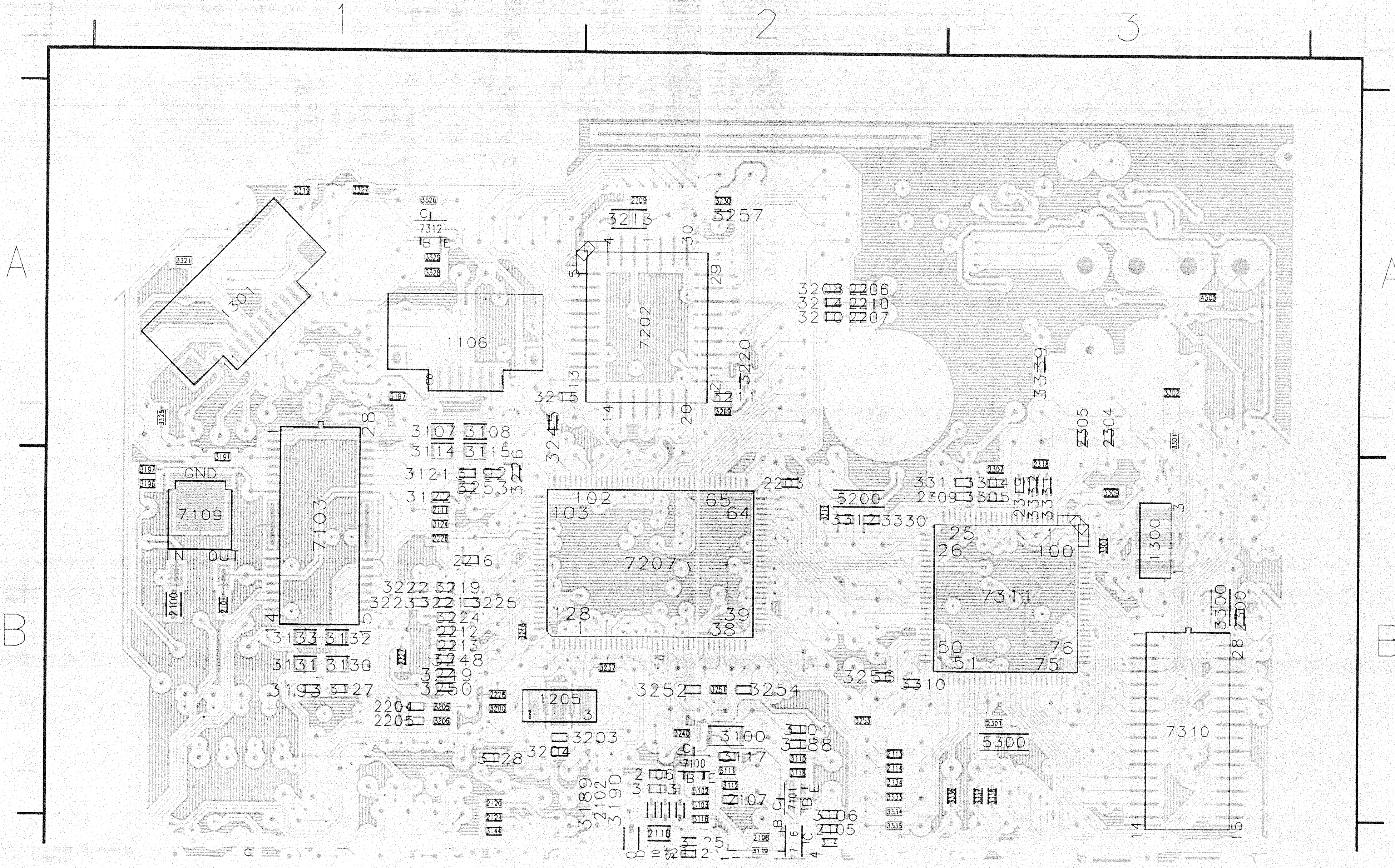
Layout Mono board: (Part 1 bottom side)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IN
OUT
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7310
1205
5200
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7100
7101
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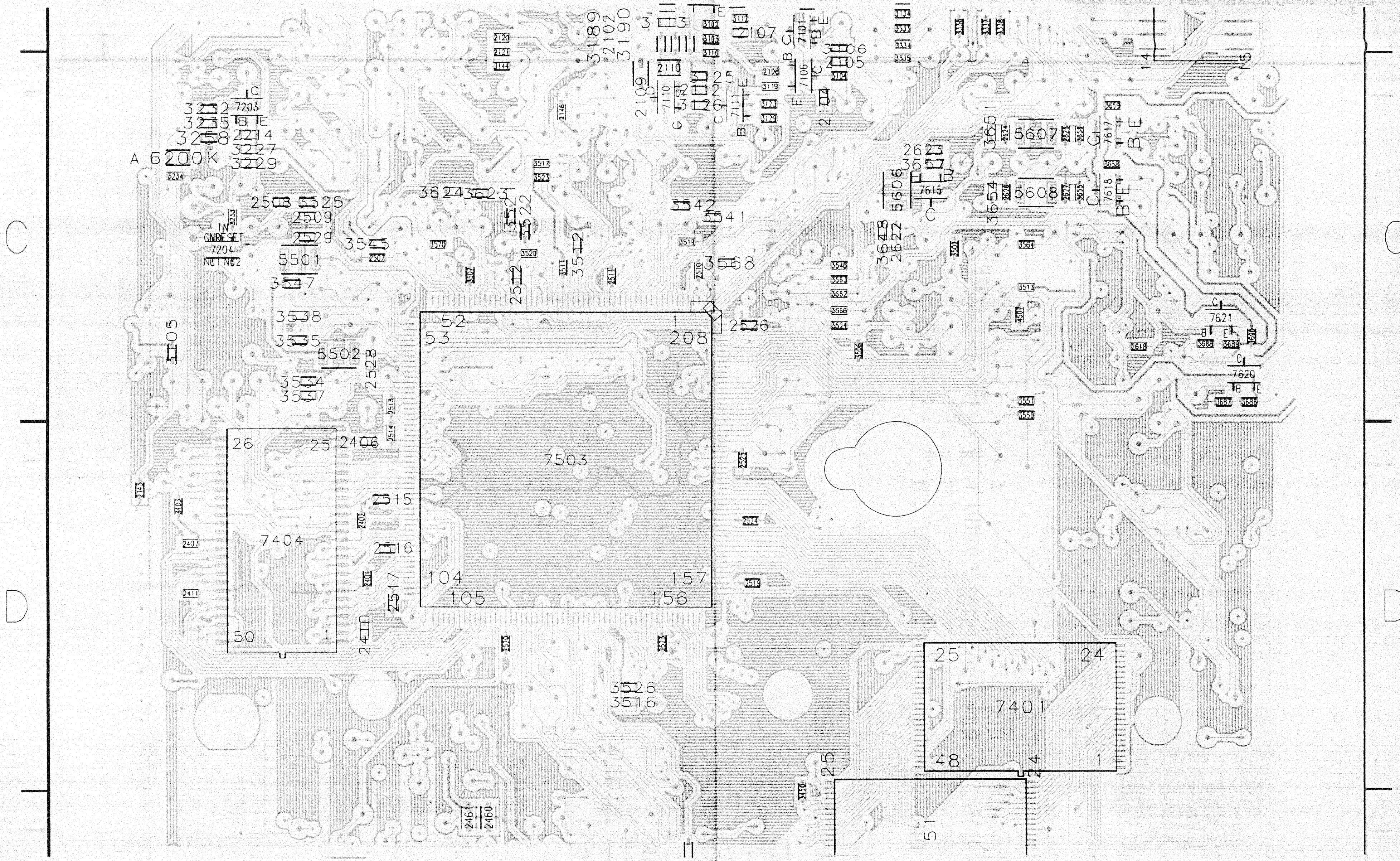
CL 06532152_86a.eps
121200

Layout Mono board: (Part 2 bottom side)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D
C
D
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24
48
1
24
25
51
A 6200 K
7203
7204
3212
3215
3258
2214
3227
3229
3234
2503
3525
2509
2529
3545
5501
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7106
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5606
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7617
7618
3651
3654
3648
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7621
7620
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2120
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CL 06532152_86b.eps
121200

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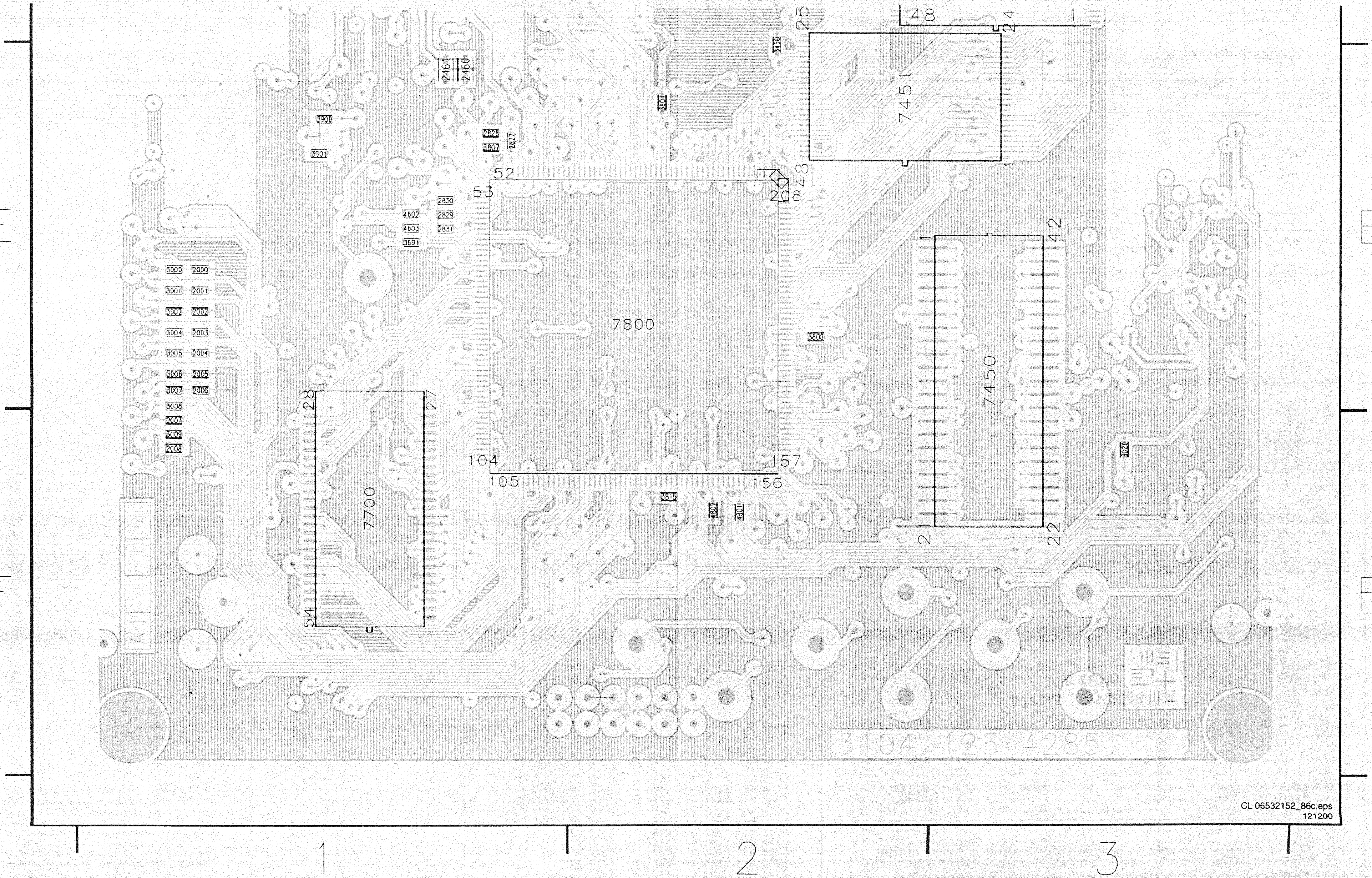
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25
48
24
1
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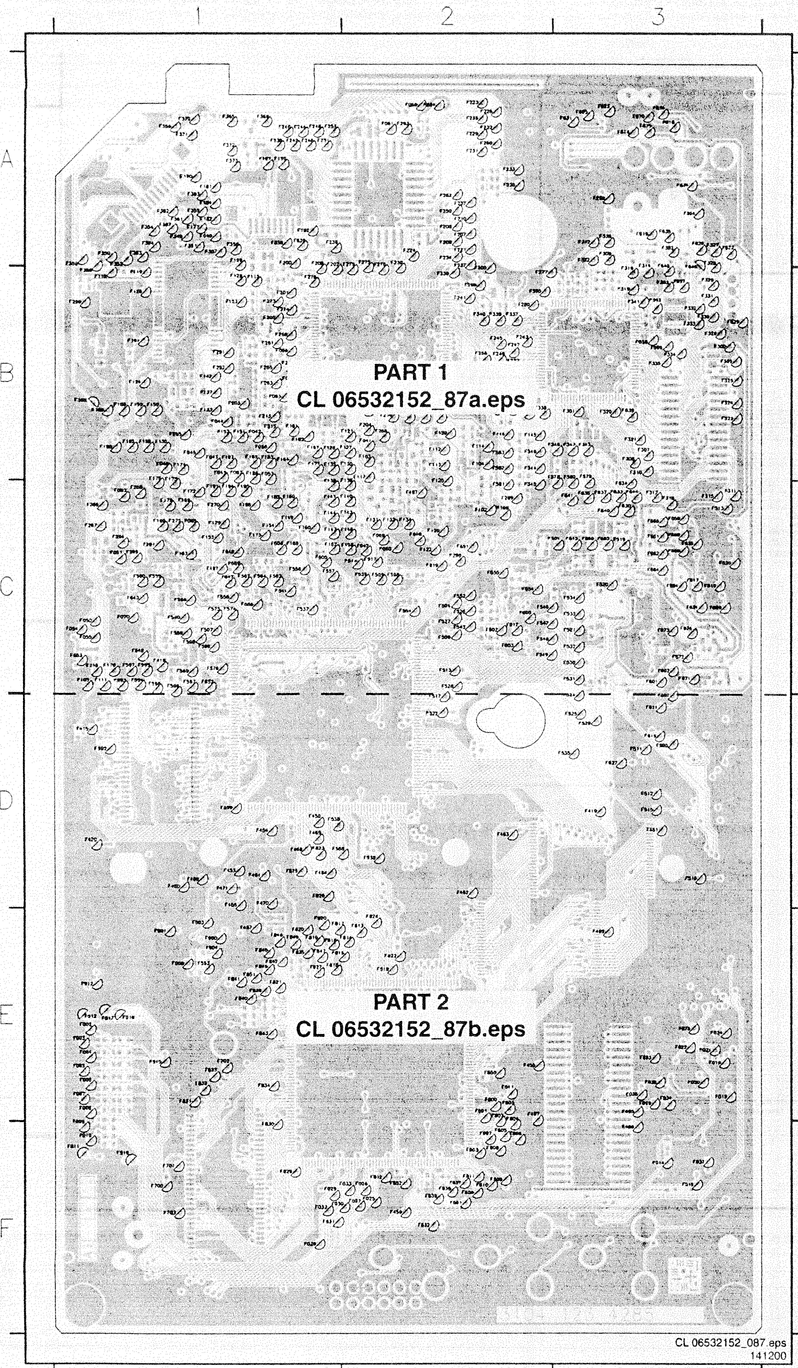
2829
4803
2831
3591
3000
2000
3001
2001
3002
2002
3004
2003
3005
2004
3006
2005
3007
2006
3008
2007
3009
2008
7800
42
7450
21
22
28
27
7700
54
1
104
105
157
156
3615
3104 123 4285
A1
E
F
1
2
3

CL 06532152_86c.eps
121200

Layout Mono board: (overview testpoints)



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F005	E1	F161	B1	F284	A2	F509	C2	F648	C1
F006	E1	F162	B1	F285	C1	F511	B3	F649	B3
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F009	F1	F165	B1	F288	C1	F514	C2	F653	C1
F010	F1	F166	B1	F289	C2	F515	D3	F654	C2
F011	F2	F167	B1	F290	C2	F516	D3	F655	C2
F012	E1	F168	B1	F291	B1	F517	D2	F656	C3
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F036	E3	F191	C1	F314	B3	F541	C1	F802	E2
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F046	B1	F201	B1	F324	B3	F553	E1	F812	E2
F047	C2	F202	B1	F325	B3	F554	C2	F813	E2
F048	C1	F203	B1	F326	B3	F555	A3	F814	E2
F049	B1	F204	B2	F327	A3	F556	C1	F815	E2
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F112	B2	F235	A2	F358	A1	F597	C1	F847	E1
F113	B2	F236	A1	F359	A1	F598	C1	F848	E1
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F119	B1	F242	A1	F365	A1	F604	C3	F900	E1
F120	B1	F243	B2	F366	A1	F605	A3	F901	E1
F121	B2	F244	A1	F367	A1	F606	C2	F903	F2
F122	C2	F245	B2	F369	A1	F607	D3	F904	E1
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F126	B1	F249	B2	F373	A1	F611	D3	F915	E1
F127	B2	F250	A2	F415	D1	F612	C2	F916	E1
F128	B1	F251	A1	F416	C1	F613	C3	F917	C2
F129	C2	F252	B2	F419	D3	F614	A3	F918	C2
F130	B2	F253	A1	F420	D1	F615	A3	F919	C2
F131	C2	F254	B2	F450	D1	F616	D3	F920	E1
F132	C2	F255	B2	F451	D3	F617	C3	F921	F2
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F138	C1	F261	B1	F457	E1	F623	A3	F927	F2
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F153	C1	F276	B2	F501	C3	F638	C3		
F154	C1	F277	B2	F502	C2	F639	B3		
F155	B1	F278	B1	F503	E1	F640	C3		
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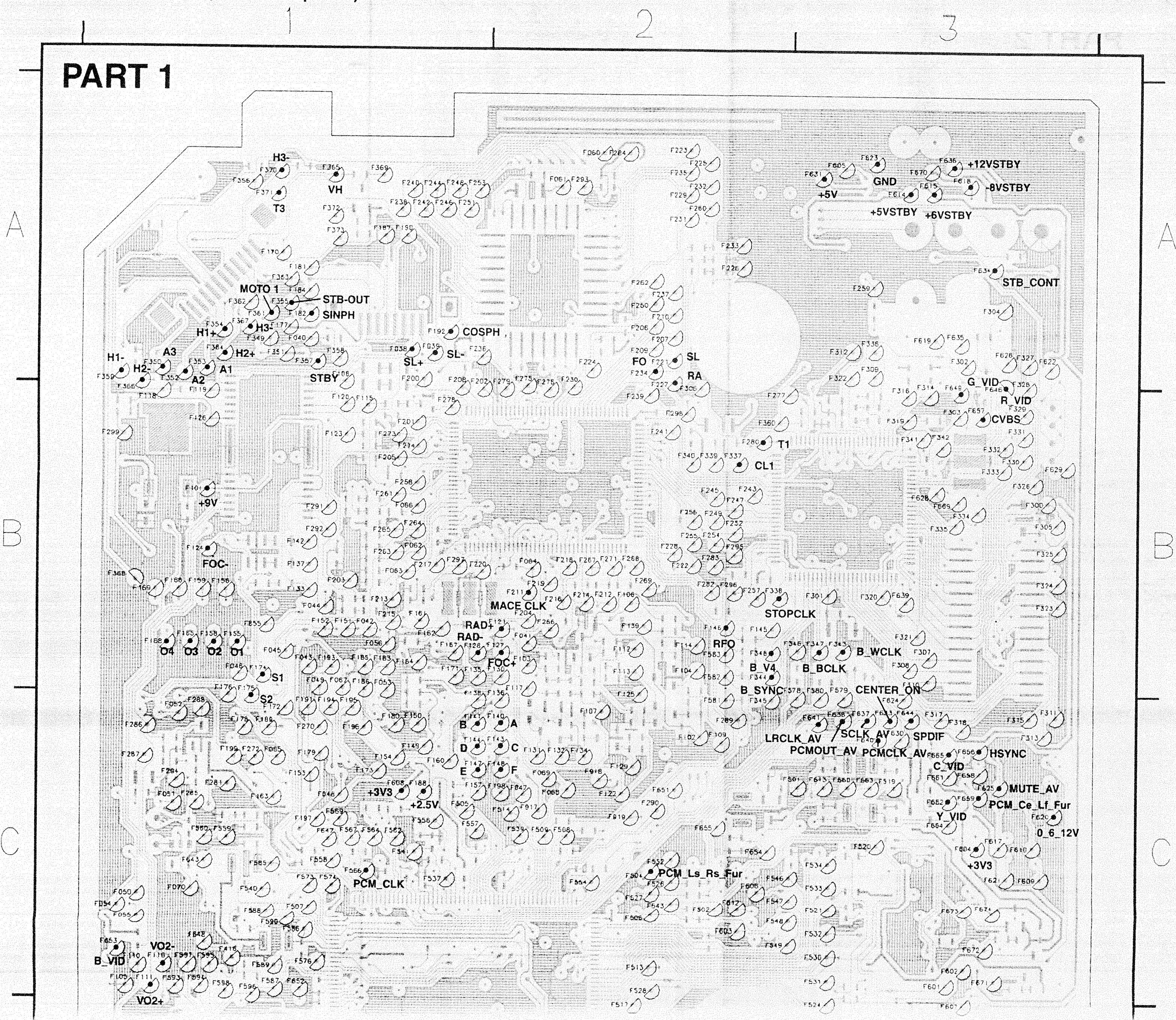
Layout Mono board: (Part 1 Test points)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B
C
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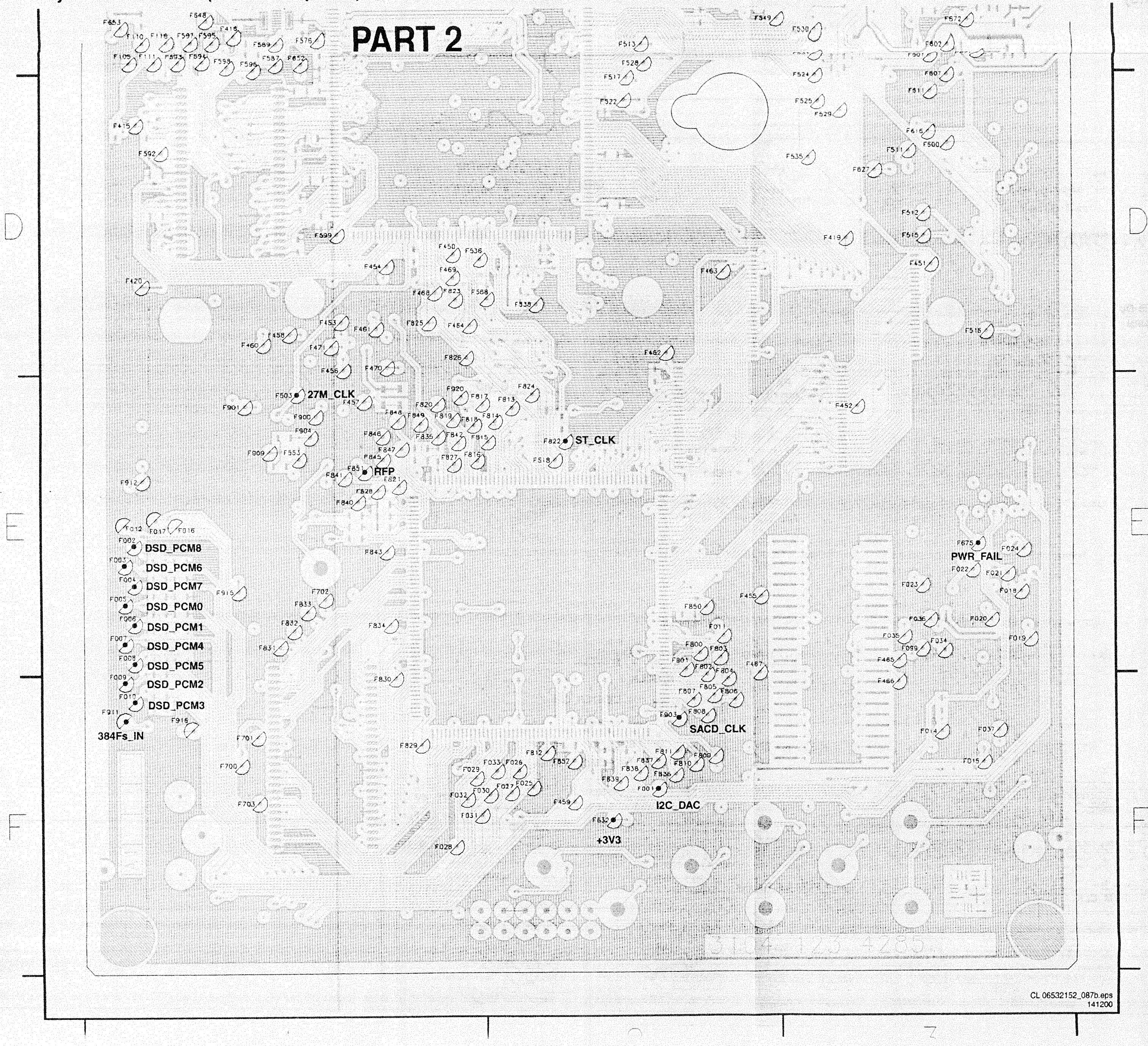
T3
VH
MOTO 1
STB-OUT
SINPH
H3+
H1+
H2+
H1-
H2-
A3
A2
A1
STBY
COSPH
SL+
SL-
FO
SL
RA
T1
CL1
+9V
FOC-
MACE CLK
RAD+
RAD-
FOC+
O4
O3
O2
O1
S1
S2
B
A
D
C
E
F
+3V3
+2.5V
PCM_CLK
PCM_Ls_Rs_Fur
VO2-
B_VID
VO2+
+5V
GND
+12VSTBY
-8VSTBY
+5VSTBY
+6VSTBY
STB_CONT
G_VID
R_VID
CVBS
STOPCLK
RFO
B_WCLK
B_V4
B_BCLK
B_SYNC
CENTER_ON
LRCLK_AV
SCLK_AV
SPDIF
PCMOUT_AV
PCMCLK_AV
HSYNC
C_VID
MUTE_AV
PCM_Ce_Lf_Fur
Y_VID
0_6_12V
+3V3

Layout Mono board: (Part 2 Test points)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DSD_PCM4
DSD_PCM5
DSD_PCM2
DSD_PCM3
384Fs_IN
PWR_FAIL
SACD_CLK
I2C_DAC
+3V3
D
E
F

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141200

8. Alignments

No alignments available

9. Circuit-, IC descriptions and list of abbreviations

9.1 SAA7399 (MACE2) General.

Mace2 is a name used for the successor of the ACE1 IC. The term MACE (mini-ACE) is used because MACE2 does not have a decoder on board. Application area's: Mainly CD-R(W) and prototyping of DVD(-ROM) or high speed CD-ROM.
Functions implemented on-board of MACE2:
A further improved digital servo module. Derived from the ACE1 servo module, but with improvements (make the input switchable between diode signal and error signal processing, improved brake).
The 80C51 micro-controller with external ROM.
The OPC. Optimum Power calibration, used for CDR.
The PCS. Position Control Sledge. A way to speed up sledge movement using hall sensors.

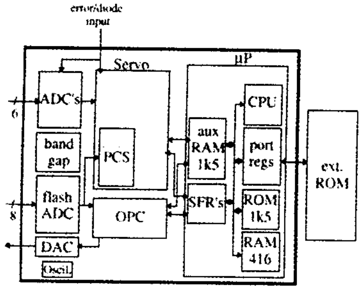

error/diode
input
Servo
µP
ADC's
6
band
gap
PCS
flash
ADC
8
OPC
DAC
Oscil
aux
RAM
1k5
SFR's
CPU
port
regs
ROM
1k5
RAM
416
ext.
ROM

Figure 9-1 Overall block diagram MACE2.

9.2 Features

- Focus and Radial servo loop.
- Built-in access procedure.
- Selectable servo error or servo diode inputs.
- Focus noise performance equivalent to DSICS
- Automatic closed loop gain control available for focus and radial loops
- High speed track crossing velocity measurement > 350 kHz.
- Fast Radial Brake circuitry.
- Sledge motor servo loop, with pulsed sledge support and PCS
- Incorporated micro-controller equivalent to 80C51 --> 66MHz.
- *Programmable wait state controller.*
- Two embedded RAM's of 416 bytes and 1.5 kB res.
- Optimum Power Calibration Hardware support up to write at N=8.
- Debug facilities.
- Memory mapped interface to sub-modules.
- Programmable clock multiplier.
- 8 Multipurpose I/O lines.
- 5 external interrupt lines.
- External Flash ROM support.
- Sledge stepper motor support.

9.3 The Digital Servo block.

In a CD system, there are some 12 control loops active. About six of them are needed to adjust the servo error signals, that is once per disc rotation offsets, signal amplitudes and loop gains (AGC's) are adjusted to enlarge system robustness and to avoid expensive potentiometer adjustments in production. The other six loops determine the laser spot position on the disc in the radial, axial (focus) and tangential directions. The servo in MACE2 takes care of these controls.
The servo inside Mace2 also has to take care that the spot accesses a required position as fast as possible. This access system consists of two parts, namely the actuator and the sled, which are within a certain range, mechanically and electrically independent. So during an access the servo has to control as well the actuator as the sled.

9.4 Functional description servo

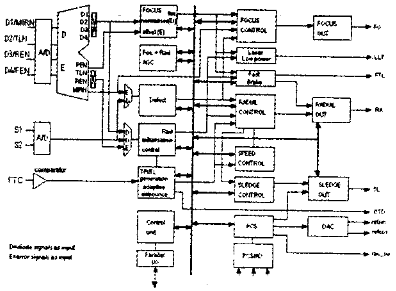

D1/MIRN
D2/TLN
D3/REN
D4/FEN
A/D
D
E
D1
D2
D3
D4
FEN
TLN
REN
MIRN
FOCUS
offset (E)
Foc. + Rad
AGC
Defect
Rad
initialisation
control
TPI/TL
generation
adaptive
debounce
Control
unit
Parallel
I/O
S1
S2
A/D
FTC
comparator
D=diode signals as input
E=error signals as input
FOCUS
CONTROL
Laser
Low power
Fast
Brake
RADIAL
CONTROL
SPEED
CONTROL
SLEDGE
CONTROL
PCS
PCSMD
FOCUS
OUT
RADIAL
OUT
SLEDGE
OUT
DAC
FO
LLP
FTL
RA
SL
OTD

Figure 9-2 Mace2 servo block diagram.

The following functions can be distinguished:

- A to D conversion: a direct AD-conversion of the diode/error currents.
- Pulse density D to A conversion: Noise shaper output stages.
- Control unit: Provides mainly the communication and on/off functions.
- Focus normaliser: A partial division of focus and sum signal. Special saturating provisions are included when dividing through very small numbers.
- initialisation control: Includes the radial normaliser, automatic radial offset compensation and level initialisation for the Track Position Indicator (TPI) for both diode and error input signals.
- TPI/TL generation and adaptive debounce: Generates Track loss (TL) which is protected against disc defects. The TL is made out of the unprotected TPI signal. The debouncer (with improved debounce times) minimises the disturbing effect of HF on the TL and Rp crossovers for the track count circuitry.

- Defect detector: Holds the focus and/or radial control signal on disc dropouts.
- Speed control: Used during access. With radial actuator feed forward.
- Focus control: PID controller with wide range adjustable characteristics.
- Radial control: PID controller with wide range adjustable characteristics.
- Sledge control: PID controller with wide range adjustable characteristics and a pulsed sledge controller.
- Laser Low Power: Switches the laser from write back to read power whenever the device tends to go off-track.

9.5 Input circuits servo

Five out of six of the MACE2 servo inputs can be switched between diode current inputs (for audio and data application) and error signal inputs (for recordable applications).
The analogue signals from the diode pre processor are converted into a digital representation using A/D converters.

9.6 Focus control.

9.6.1 Focus start-up.

To bring the actuator in focus position a triangular shaped voltage is applied to the actuator to perform a search movement. When the lens moves from or to the disc, CA (central aperture) is monitored to reach a certain programmable absolute level. When this value is CA level is reached, the FOK signal becomes true and FEn is passed to the FEn level detector.
At the moment this FEn level is reached the wait for the focus mode is entered and the focus control loop is enabled to detect a sign inversion in the FEn signal.
When this zero crossing in this FEn signal is detected, the loop is closed to function as PID controlled loop and is switched to the PID mode.
During focus start-up a dither signal is added to the output signal of the integrator. It prevents the actuator from hitting its natural resonance. With this technique quantisation, effects are compensated for during start-up.

9.6.2 Focus Position Control loop.

The focus control loop contains a digital PID controller that has 5 parameters available to the user. These coefficients influence the integrating, proportional and differential action of this PID and a digital low pass filter following the PID. The fifth coefficient influences the loop gain.

9.6.3 Dropout detection.

This detector can be influenced by one parameter. The FOK signal will become false and the integrator of the PID will hold if the CA signal drops below this programmable absolute CA level. When the FOK signal becomes false, it is assumed as caused by a black dot in the first place.

9.6.4 Focus Loss detection and Fast restart.

Whenever FOK is false longer than about 2 ms, it is assumed that the focus point is lost. A fast restart procedure is initiated which is capable of restarting the focus loop within 200 to 300 ms depending on the uP-programmed coefficients.

9.6.5 Focus Automatic Gain Control loop.

The loop gain of the focus control loop can be corrected automatically to eliminate tolerances in the focus loop. This gain control injects a signal into the loop that is used to correct the loop gain. Since this decreases the optimal performance, the gain control should only activated shortly (for instance when starting a new disc).

9.7 Radial control.

The MACE2 digital controller includes the following radial servo functions:

9.7.1 Level initialisation:

During start-up an automatic adjustment procedure is activated to set the values of the radial error gain, offset and satellite sum/MIRN signal gain for TPI level generation. The initialisation procedure runs in a radial open loop situation and is < 200 ms. This start-up time period may coincide with the last part of the turntable motor start-up time period.

9.7.2 Automatic gain adjustment:

Because of this initialisation the amplitude of the RE signal is adjusted within _10% around the nominal RE amplitude.
Offset adjustment: The additional offset in RE due to the limited accuracy of the start-up procedure is less than +/- 50nm.

9.7.3 TPI level generation:

The accuracy of the initialisation procedure is such that the duty cycle range of TPI becomes 0.4 < duty cycle < 0.6.

Sledge home:
Sledge moves to reference position at the inner side of the disc with user defined voltage.

Tracking control:
The actuator is controlled using a PID loop filter with user defined coefficients.

Access:
In Mace2 there are two fundamentally different ways to perform an access:

Using the PCS
A more detailed description of this access method is given in an other section.

Using the servo controlled access:
The way it was done in the predecessors of Mace2.This access procedure is divided into 3 different modes, depending on the requested jump size:
access type size access speed
Actuator jump decreasing velocity
Sledge jump maximum power to sledge 1
Controlled sl. jump controlled brake power
The access procedure makes use of a track counting mechanism, a velocity signal based upon the number of tracks passed within a fixed time interval, a velocity setpoint calculated from the number of tracks to go and a user programmable parameter indicating the maximum sledge performance.
If the number of tracks to jump is too large, then the Sledge jump mode is activated, else the actuator jump is performed. The requested jump size together with the required sledge braking distance at maximum access speed defines the value of the maximum numbers of tracks.
During the actuator jump mode, velocity control with a PI controller is used for the actuator. The sledge is then continuously controlled using the filtered value of the integrator contents of the actuator. All filter parameters (for actuator and sledge) are user programmable.

In the sledge jump mode maximum power (user programmable) is applied to the sledge in the correct direction, while the actuator becomes idle.

Radial Automatic Gain Control loop:
The loop gain of the radial control loop can be corrected automatically to eliminate tolerances in the radial loop. This gain control injects a signal into the loop which is used to correct the loop gain. Since this decreases the optimal performance the gain control should only be activated shortly (for instance when starting a new disc). This gain control differs from the earlier mentioned level initialisation. This level initialisation should be done first. The level initialisation without the gain control reduces tolerances from the front-end only.

9.8 The radial PID.

Since we are dealing with a big variety of applications and drives, the servo controllers in MACE2 should be adjustable within a large frequency range.
In order to read out the track properly -a track consists of sequential ordered data pit's which hold audio, video or ROM data - the focus and radial position controls must follow the moving track within some tenths of a micrometer, despite of disc imperfections and external disturbances.
For instance, a rotating disc causes, due to track eccentricity, track unroundness, or disc skew, track movements up to some millimetres. The control loop reduces this to about one tenth of a micrometer.

9.9 Initialisation control.

Due to optical, electrical and mechanical tolerances in CD players, properties of the servo signals such as offset and gain can vary. In general, without proper signal processing, a simple PID controller function cannot cope with this relatively large offset and gain spreads. Therefore, gain and offset adjustments during manufacture or active control, to compensate for these signal imperfections, become inevitable.
Adjustment procedures in the factory are expensive. So, automatic adjustment procedures have been implemented in order to avoid most of the potentiometer adjustments. In the MACE2 servo automatic adjustments are applied to the radial error signal only.

9.10 The AGC.

The Automatic Gain Control is used in the MACE2 digital servo to adjust the radial and focus bandwidths to a nominal value. Injecting a signal in the loop and measuring the phase of its resulting signal (wobble method) does this.
Principle of the Automatic Gain Control.
The principle of the Automatic Gain Control (AGC) circuit, as used in MACE2, is drawn in the next figure.

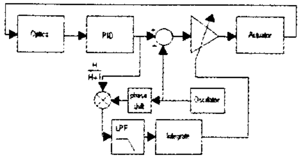


Figure 9-3 Principle of the automatic gain control.

A sine wave signal with a certain frequency is injected in the control loop at the summation point. The resulting signal is measured before the injection point. The injected signal is shaped by H/1+H . This measured signal is multiplied by a phase shifted version of the injected signal. The result of the multiplication is low pass filtered and integrated. (The integrator is started at the nominal gain of the control loop). The result of the integration is fed to the adjustable loop gain. This principle, synchronous detection, is also known as 'wobble method'.

9.11 The Fast brake.

The fast brake is an aid to speed up radial capture after a high-speed jump. It is a separate radial control with a much higher bandwidth. The radial control output can be switched between fast brake mode and original radial control mode. The fast brake helps the radial actuator at the end of a jump to "stick" to the right track. In fast brake mode, the actuator starts to follow the track movements. It's a bit like jumping on a moving train. If you run as fast as the train, you can just step in. After a radial open loop jump the tracks are moving (as a result of eccentricity) at a very high speed underneath the radial actuator. This speed is too high for a normal radial control loop to do radial capture. When the radial control is switched over to fast brake mode for a short term, this moving of the tracks underneath the actuator becomes much slower, (because the actuator follows the track movement), so when you switch back to original radial control, it's much easier to do radial capture.

9.12 The Defect Detector.

Because of the possible earlier mentioned defects (fingerprints, etc) a defect detection circuit is incorporated into the MACE2 servo. If a defect is detected, the radial and focus error signals may be zeroed, resulting in better playability.

9.12.1 Operation:

The defect detector prevents the light spot from going out of focus and going off track due to disc dropout excitations. The defect detector can be switched on and off under software control and can be applied to the focus control only, or both to the focus and radial control.
Whenever this circuit detects a defect, it will hold all radial and focus controls.
The hold signal is generated whenever the reflected light intensity drops rapidly (< 1:5 ms) down to roughly 75% of the actual intensity level. In that case the output of the comparator becomes active and controls the focus and radial signal switch.
This circuit improves the playability of the application (black dot performance, etc) and is programmable to optimise it for specific disc defects. The actions of this circuit can be monitored on the DEFO pin (active high).
An external defect detection circuit can be added by removing the connection between DEFO and DEFI (normal operation) and inserting the external circuitry.
These signals are afflicted with some uncertainties caused by:

- Disc defects like scratches and fingerprints
- The HF information on the disc, which is considered as noise by the detector signals.

9.13 Laser Drive On.

The LDON pin is used to switch the laser drive off and on. It is an open drain output. In case the laser is on, the output has a high impedance. The pin will be automatically driven if the focus control loop is switched on.

9.14 Laser Low Power (LLP).

The LLP output can be used by write-able systems to switch the laser back to read power when the light spot goes off-track while writing discs. To prevent that the neighbour tracks are damaged when the spot goes off-track the laser has to be switched very fast to the safe read power. The laser is not switched off (like LDON does), so the system can carry on reading.
The tracking (radial) and focus error signals are used to disable the laser write power. This is done through the LLPn, active low Laser Low Power, signal. Note that LLPn is a servo output, which is inverted before it is output via the LLP pin, so the LLP pin is active high.
So, if any of the following conditions is true, the laser write power is disabled by the MACE2 servo.

- Off Track, more than a quarter off a track away from the correct one
- ORD, radial error signal too large. Larger than the given setpoint, which should be chosen at a critical write failure level. An adjustable band pass filter first processes the radial error signal.
- OFD, focus error signal too large. Larger than the given setpoint, which should also be chosen with care. An adjustable band pass filter also first processes the focus error signal. All settings of the focus and radial part are independent.
- OTR, prot stat flag which becomes active if ORD becomes active during an actual laser write (LWR) action. This flag is reset only by a status read (RSTAT) command. So until then LLPN stays active.
- OFO, prot stat flag that becomes active if OFD becomes active during an actual laser write action. Same idea as OTR.

This error detection circuit can be switched off (apart from the Off Track detection) by raising the setpoint levels to its maximum value.

9.15 The OPC.

The OPC block in Mace2 is used for the following functions:

- During write actions, it stores Pw samples, which can be evaluated by the microprocessor.
- During OPC read actions, it stores A1, A2 and CALF samples, which are used for calculating the asymmetry and the modulation index.
- The OPC block is used for EFM detection.
- During reading of a disc, it stores A1 and CALF samples, which can be monitored.

Although the OPC block is used for multiple functions, it got it's name from the OPC procedure, which is it's main task.
The OPC (Optimum Power Calibration) procedure is used in CD-R/CD-RW/DVD-RAM applications. It is used to "calibrate" the laser write power in writable systems.
It reads in 3 analogue signals from an analogue pre-processor like AEGER-2 (A1, A2, and CALF) and the actual write power (Pw) from the laser controller and feeds an analogue output signal Alpha0 back to AEGER-2. A1, A2 and CALF represent the max, min and average value of the EFM signal respectively. Alpha0 controls the laser write power. All analogue signals are converted to an 8 bit digital signal.
Conversion frequency at 16.9MHz base clock is 88kHz (each channel)

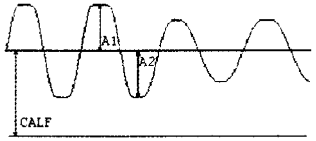


Figure 9-4 Definition of the A1, A2 and CALF signals.

9.16 Definition of terms.

The asymmetry (and modulation index m of the EFM signal are calculated from the analogue inputs:

$$\beta = \frac{A1-A2}{A1+A2}$$

$$m = \frac{A1+A2}{A1+CALF}$$

9.17 Rough description of the OPC procedure

Basically the OPC procedure tries to find out the optimum laser power to be used on a specific disc. The OPC procedure uses about 15 ATIP frames. These frames are located in the "PCA" area. This is a special part of the disc used only for power calibration. The drive first checks whether there are 15 frames "empty" in the PCA. Next the OPC is performed in these 15 frames.
The OPC operation consists of two stages: A "write" and a "read" stage. First 15 ATIP frames are written (during which the OPC block stores Pw samples), and then the same 15 ATIP frames are read back again, (during which the OPC block stores A1, A2 and CALF samples). During the write stage, random EFMis written in a test area located on the inner side of the disc. During this recording the write power is increased stepwise from a low to a high power level.

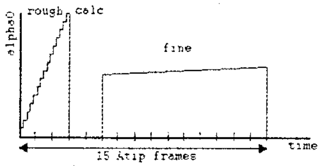


Figure 9-5 Figure 5: OPC write profile.

First during 3 ATIP frames the power is increased in rather big steps (rough OPC). During this action Pw samples are stored into memory. During the rough OPC, the OPC makes 7 steps per ATIP frame. This gives 21 samples into the OPC memory. From these samples, the microprocessor can calculate what's roughly the best alpha0 setting for this typical disc.
After 2 frames of calculations, another 10 ATIP frames are written using smaller steps (fine OPC) around the alpha0 setting, which gave the best result during the rough OPC.
The second stage of the OPC procedure is the "read" phase in which the pattern recorded in the previous stage is read back.
During this read phase the OPC block stores A1, A2 and CALF samples from exact the same location where during the OPC write phase the Pw samples where stored. The samples for A1, A2, CALF and Pw are listed side by side into memory. After the read back phase the processor calculates at which setting of alpha0 the least jitter is encountered. This setting will be used to write the disc with.

9.18 The OPC top level.

The OPC block as a whole has 5 possible modes:

- Recording mode: This can be either OPC writing (writing EFM test patterns to disc and Alpha0 stepping) or standard write mode (i.e. alpha0 is constant).
- OPC reading: Reading back OPC test patterns from disc.
- Normal read mode: detects the presence of EFM.
- DVD read mode: used for DVD-RAM experiments.
- EFMD only mode: no data being written to the AUX RAM, but the EFM detector and the PW monitor still running. Contents of the QUX RAM remain unchanged.

All actions in the OPC hardware are synchronised to the ATIP frame sync, which can be either generated internally or received from the encoder/decoder during writing. The microprocessor writes data asynchronously to the OPC hardware. The OPC block synchronises this data to the sync either internally generated, or obtained from CDR60.

9.19 The Analogue to Digital converter.

The analogue to digital converter of the OPC is shared with the ADC required by the PCS.

9.20 The digital input filters.

The combined ADC for the OPC and the PCS delivers a multiplexed stream of 8 bit words. A sequential low-pass filter filters this multiplexed stream. The 4 analogue multiplexed input signals from the OPC (A1, A2, CALF and Pw) are filtered by 4 identical LPF's. (One for each channel). This filters can be adapted to various speeds by changing the subsampling factor (i.e. the sample rate of the filter), the cut off frequency scales with the sample frequency. The sample frequency of the filter is equivalent to the OPC timebase frequency, which is the output of the pre-scaler.

9.21 OPC demux.

The OPC demux block demultiplexes the stream supplied by the LPF. This same block also changes the format of the digital data from signed (representation inside the filter) to unsigned (representation in the rest of the OPC). The demultiplexing process introduces one baseclock delay.

9.22 The sequencer.

The OPC sequencer controls the timing of all the hardware actions in the OPC hardware. It generates the OPC timebase and locks it to the ATIP pulse. A programmable pre-scaler generates the OPC timebase.
Dividing the ADC sample clock by 8 derives the input clock of this pre-scaler. (= Identical to the sample rate per channel). The pre-scaler can divide this clock by a number in the range from 1-16. The division factor can be programmed via the OPC ctrl register. The OPC timebase is locked to the selected ATIP source, which can be either an external ATI P sync or an internally generated sync. (Programmable). The OPC timebase clock supplies the sample frequency for the input LPF's, the OPC pre-processor and the EFM detector.
The sequencer controls the timing of all the hardware actions in the OPC hardware. The sequencer is started either by an external ATIP sync or an internally generated sync (programmable).
All data acquisition and alpha0 settings change synchronised to this sync signal (rising edge of the ATIP sync). An exception on this is the switching of the ATIP input itself, which is immediately changed whenever the bit in the OPC ctrl register is changed. When this was latched on the ATIP source itself, it would create a deadlock when there was no ATIPin from CDR-60.

9.23 The Pw monitor

The Pw monitor is used during the "OPC write" and normal write mode. The comparator compares the incoming Pw with two programmable thresholds PW MAX and PW MIN. Both these thresholds can be programmed via the OPC PW register, which contains 4 bits for each threshold.
Internally both 4-bit thresholds PW MAX and PW MIN are extended to 8 bit values. The compare function performs an unsigned compare.
The first threshold is used to detect fingerprints. The second is used to check the correct operation of the laser driver.

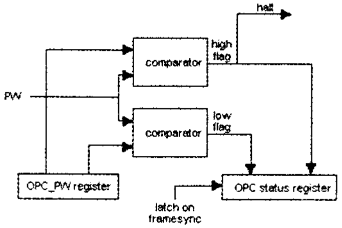


Figure 9-6 OPC PW monitor.

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

FEATURES

- Operates with DVD-ROM,DVD-RAM, DVD+RW, DVD-RW, CD-ROM and CD-RW media
- Operates up to 64x CD-ROM and 8x DVD-ROM
- Support for Dual Light pen DVD systems (DVD/CDRW)
- DVD-RAM (C) playback capability
- DVD-RAM Land-Groove servo polarity switching
- 3 different tracking servo strategies:
  Conventional 3 beam tracking for CD
  Differential Phase Detection (DPD) for DVD-ROM (including option to emulate traditional drop out detection; drop out concealment)
  Advanced Push Pull with dynamic offset compensation for DVD-RAM (recorded and unrecorded areas)
- Radial error signal for fast track counting (FTC)
- 2 different strategies to read header data:
  - Full bandwidth Push Pull signal
  - Left and Right side signal
- Universal photo diode IC interface using internal conversion resistors and offset cancelation
- Flexible adaption to different light pen configurations
- Input buffer amplifiers with low-pass filtering
- RF data amplifier with wide (programmable) bandwidth equivalent to 64xCD / 8x DVD when using equaliser function
- Built-in equalisers cover CAV inner-outer disc range at highest speed.
- Programmable RF gain for DVD-ROM / DVD-RAM / CD-RW / CDROM applications(approx 50dB range)
- Balanced RF-Data signal transfer (single ended still supported)
- Fully automatic laser control including stabilization and an ON/OFF switch, plus a separate supplypin for power efficiency
- Automatic monitor diode polarity selection.
- 3 and 5 V compatible digital interface
- Enhanced signal conditioning in DPD circuit for optimal tracking performance under noisy conditions.

GENERAL DESCRIPTION

The DVDALAS2 is an analogue preprocessor and laser supply circuit for DVD / CD read only players. The device contains data amplifiers, several options for radial tracking and focus control. The preamplifier forms a versatile, programmable interface between dual, voltage output CD/DVD mechanisms to Philips' digital signal processor family for CD and DVD (Gecko, HDR65, Iguano, etc..)

The device contains serval options for radial tracking:
Conventional 3 beam tracking for CD;
Differential Phase Detector (DPD) for DVD;
Push Pull for DVD-RAM with flexible L/R weighing to compensate dynamic offsets e.g. beamlanding offset.
A radial error signal is generated to allow fast track count (FTC) during track jumps.

The dynamic range of this preamp/processor combination can be optimized for the LF servo and RF data paths. The gain in both channels can be programmed separately. This will guarantee an optimal playability for all kind of discs.

Several functions are included to allow playback of DVD-RAM(C) discs:

- The header information can be read via the data output path (RF)
- DC offset compensation techniques provide a fast settling after disc errors.
- Radial servo Polarity switch for land/groove
- two settings for focus offset correction for land and groove

The device can accommodate astigmatic, single foucault and double foucault detectors and can be used with P-type lasers with N- or P-sub monitor diodes. After an initial adjustment, the circuit will maintain control over the laser diode current. With an on-chip reference voltage generator, a constant and stabilized output power is ensured independent of ageing. A separate power supply connection allows the internal power dissipation to be reduced by connecting a low voltage supply.

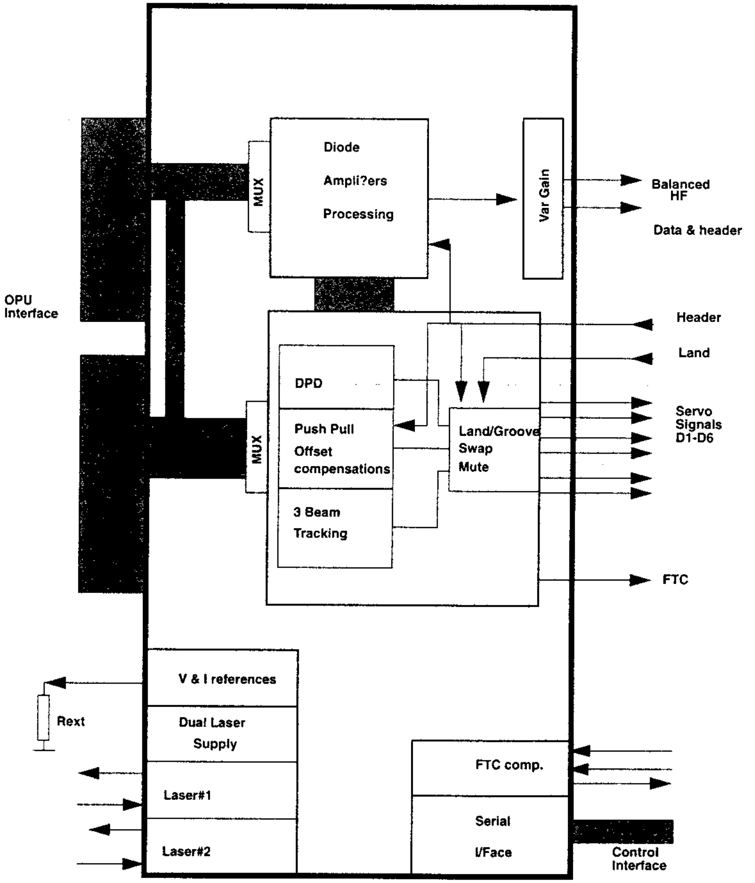
ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TZA1023	LQFP64	Plastic low pro?le QFP64; body 10 x 10 x 1.4 mm	SOT314-2

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

DEVICE BLOCK DIAGRAM



DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

PINNING

Name	**Pin**	**Description**
CD-A	1	CD pick up input A
CD-B	2	CD pick up input B
CD-C	3	CD pick up input C
CD-D	4	CD pick up input D
CD-REF	5	CD pick up reference voltage
CD-E	6	CD pick up input E
CD-F	7	CD pick up input F
DVD-A	12	DVD pick up input A
DVD-B	13	DVD pick up input B
DVD-C	14	DVD pick up input C
DVD-D	15	DVD pick up input D
DVD-ref	16	DVD pick up reference voltage
O-A	48	Servo current output for Focus-A
O-B	47	Servo current output for Focus-B
O-C	46	Servo current output for Focus-C
O-D	45	Servo current output for Focus-D
O-central	40	Testpin for offset cancelation
TD2	37	Internally connected
FTC-ref	36	Servo output voltage reference input
S1	42	Servo current output for radial tracking
S2	41	Servo current output for radial tracking
TD1	35	Internally connected
FTC	33	Fast track count voltage output
RFP	55	pos. RF output signal
RFN	56	neg. RF output signal
RF-REF	54	DC Reference signal input RF
LPF-DPD1	38	DPD Low pass bandwidth capacitor, channel pos
LPF-DPD2	39	DPD Low passbandwidth capacitor, channel neg
Land	20	Land/groove toggle input
HEADER	21	Header detector window input
CD-MI	62	CD laser monitor input
DVD-MI	10	DVD laser monitor input
CD-LO	61	CD laser output
DVD-LO	64	DVD laser output
COP	27	Positive inputFTC comparator
COM	28	Inverting inputFTC comparator
COO	29	FTC comparator output

DVDALAS2plus Advanced Analogue DVD Signal Processor and Laser Supply

TZA1033

Name	**Pin**	**Description**
SIDA	23	Serial host interface data input
SICL	24	Serial host interface clock input
SILD	25	Serial host interface load
VDDA1	8	Analog Supply voltage 1 (RF input)
VDDA2	59	Analog Supply voltage 2 (RF internal)
VDDA3	53	Analog Supply voltage 3 (RF output stage)
VDDA4	44	Analog Supply voltage 4 (Servo)
VDDD5	30	Digital Supply voltage (5V dig core)
VDDD3	22	Digital Supply voltage (3V I/O pads and FTC comp.)
VDDL	63	Supply voltage for laser
VSSA1	9	Analog Ground 1
VSSA2	58	Analog Ground 2
VSSA3	57	Analog Ground 3
VSSA4	43	Analog Ground 4
VSSD	26	Digital ground
Rext	60	Reference current input (Connect 12k1 to VSSA4)
STB	31	Standby input
TM	19	Testmode input
TDO	34	test data out

DVDALAS2plus Advanced Analogue DVD
Signal Processor and Laser Supply
TZA1033

PINNING

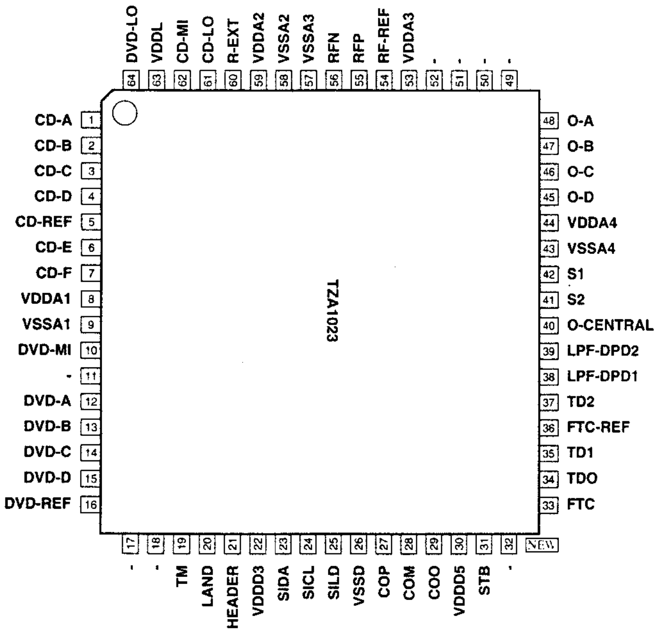

DVD-LO
VDDL
CD-MI
CD-LO
R-EXT
VDDA2
VSSA2
VSSA3
RFN
RFP
RF-REF
VDDA3
CD-A
CD-B
CD-C
CD-D
CD-REF
CD-E
CD-F
VDDA1
VSSA1
DVD-MI
DVD-A
DVD-B
DVD-C
DVD-D
DVD-REF
O-A
O-B
O-C
O-D
VDDA4
VSSA4
S1
S2
O-CENTRAL
LPF-DPD2
LPF-DPD1
TD2
FTC-REF
TD1
TDO
FTC
TM
LAND
HEADER
VDDD3
SIDA
SICL
SILD
VSSD
COP
COM
COO
VDDD5
STB
TZA1023

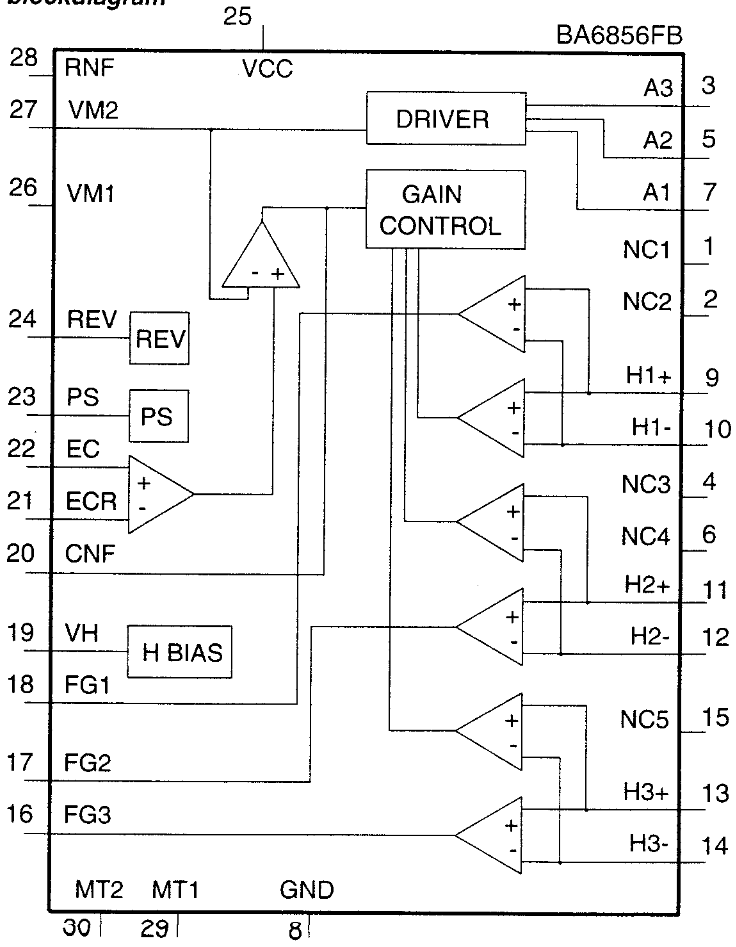
Fig.2 Pin configuration.

BA6856FP: 3 PHASE MOTOR DRIVER FOR DVD PLAYERS

Features

- /3-phase, full-wave pseudo linear driving system
- built-in power save
- built-in therma shut down circuit
- built-in current limit circuit
- built in Hall bias circuit
- built in FG-output (3-phase parallel output)
- with switching function of regular/ reverse rotations

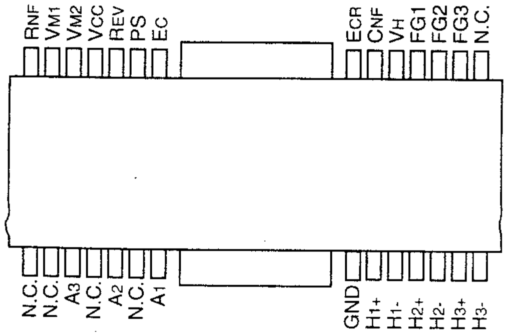
blockdiagram


25
BA6856FB
28 RNF
VCC
27 VM2
26 VM1
DRIVER
GAIN CONTROL
24 REV
REV
23 PS
PS
22 EC
21 ECR
20 CNF
19 VH
H BIAS
18 FG1
17 FG2
16 FG3
MT2 MT1 GND
30 29 8
A3 3
A2 5
A1 7
NC1 1
NC2 2
H1+ 9
H1- 10
NC3 4
NC4 6
H2+ 11
H2- 12
NC5 15
H3+ 13
H3- 14

pin description

PIN No	PIN NAME	DESCRIPTION
1	N.C.	Not connected
2	N.C.	Not connected
3	A_3	Output 3 for motor
4	N.C.	Not connected
5	A_2	Output 2 for motor
6	N.C.	Not connected
7	A_1	Output 1 for motor
8	GND	Ground
9	H_1^+	Hall input Amp1. positive input
10	H_1^-	Hall input Amp1. negative input
11	H_2^+	Hall input Amp2. positive input
12	H_2^-	Hall input Amp2. negative input
13	H_3^+	Hall input Amp3. positive input
14	H_3^-	Hall input Amp3. negative input
15	N.C.	Not connected
16	FG3	FG3 signal output terminal
17	FG2	FG2 signal output terminal
18	FG1	FG1 signal output terminal
19	V_H	Hall Bias
20	C_{NF}	Capacitor connection pin for phase compensation
21	E_{CR}	Torque control standard voltage input terminal
22	E_C	Torque control voltage input terminal
23	PS	POWER SAVE switch
24	R_{EV}	Reverse terminal
25	V_{CC}	Power supply for sinal division
26	V_{M2}	Power supply 2 for driver
27	V_{M1}	Power supply 2 for driver
28	R_{NF}	Power supply for driver division
FIN	FIN	GND

Terminal lay-out



DSP for CD and DVD-ROM systems SAA7335

FEATURES

- Compatibility with CD-I, CD-ROM, MPEG-video DVD-ROM and DVD-video applications
- Designed for very high playback speeds
- Typical CD-ROM operation up to n = 12, DVD-ROM to n = 1.9, maximum rates (tbf)
- Matched filtering, quad-pass error correction (C1-C2-C1-C2), overspeed audio playback function included (up to 3 kbytes buffer)
- Lock-to-disc playback, Constant Angular Velocity (CAV), pseudo-Constant Linear Velocity (CLV) and CLV motor control loops
- Interface to 32 kbytes SRAM for DVD error correction and de-interleave
- Sub-code/ header processing for DVD and CD formats
- Programmable HF equalizer
- In DVD mode it is still compatible with Philips block decoders
- Sub-CPU interface can be parallel or fast I^2C-bus
- On-chip clock multiplier.

GENERAL DESCRIPTION

This device is a high-end combined Compact Disc (CD) and Digital Versatile Disc (DVD) compatible decoding device. The device operates with an external 32 kbytes S-RAM memory for de-interleaving operations. The device provides quad-pass error correction for CD-ROM applications (C1-C2-C1-C2) and operates in lock-to-disk, CAV, pseudo CLV and CLV modes.

In DVD modes double-pass C1-C2 error correction is used which is capable of correcting up to 5 C1 frame errors and 16 C2 frame errors.

The SAA7335 contains all the functions required to decode an EFM or EFM+ HF signal directly from the laser pre-amplifier, including analog front-end, PLL data recovery, demodulation and error correction. The spindle motor interface provides both motor control signals from the demodulator and, in addition, contains a tachometer loop that accepts tachometer pulses from the motor unit.

The SAA7335 has two independent microcontroller interfaces. The first is a serial I^2C-bus and the second is a standard 8-bit multiplexed parallel interface. Both of these interfaces provide access to a total of 32 × 8-bit registers for control and status.

This data sheet contains an descriptive overview of the device together with electrical and timing characteristics. For a detailed description of the device refer to the user guide *"SAU/UM96018"*.

Supply of this CD/DVD IC does not convey an implied license under any patent right to use this IC in any CD or DVD application.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{DDD}	digital supply voltage	4.5	5.0	5.5	V
I_{DDD}	digital supply current	–	70	300	mA
V_{DDA}	analog supply voltage	4.5	5.0	5.5	V
I_{DDA}	analog supply current	–	70	300	mA
f_{xtal}	crystal input frequency	4	25	tbf	MHz
T_{amb}	operating ambient temperature	−20	–	+70	°C
T_{stg}	storage temperature	−55	–	+125	°C

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
SAA7335GP	LQFP100	plastic low pro?le quad ?at package; 100 leads; body 14 × 14 × 1.4 mm	SOT407-1

BLOCK DIAGRAM

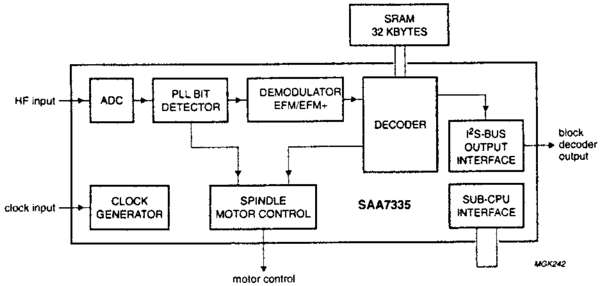

SRAM
32 KBYTES
HF input
ADC
PLL BIT DETECTOR
DEMODULATOR EFM/EFM+
DECODER
I²S-BUS OUTPUT INTERFACE
block decoder output
clock input
CLOCK GENERATOR
SPINDLE MOTOR CONTROL
SAA7335
SUB-CPU INTERFACE
motor control
MGK242

Fig.1 Simplified block diagram.

PINNING

SYMBOL	PIN	TYPE	DESCRIPTION
V_{SSA1}	1	supply	analog ground 1
I_{ref}	2	I	analog current reference input for ADC
REFLo	3	I	analog low reference input for ADC
REFHi	4	I	analog high reference input for ADC
VREF	5	I	analog negative input
HFIN	6	I	analog positive input
V_{SSA2}	7	supply	analog ground 2
AGCOUT	8	O	analog test pin output
V_{DDA2}	9	supply	analog supply voltage 2
V_{DDD1}	10	supply	digital supply voltage 1
V_{SSD1}	11	supply	digital ground 1
OTD	12	I	off track detect input
MOTO1	13	O	3-state motor control output
n.c.	14	–	not connected, reserved
MOTO2/T3	15	I/O	motor control output/tachometer 3 input
n.c.	16	–	not connected, reserved
T1	17	I	tachometer 1 input
T2	18	I	tachometer 2 input
V_{DDD2}	19	supply	digital supply voltage 2
V_{SSD2}	20	supply	digital ground 2
TEST1	21	I	test input 1
TEST2	22	I	test input 2
POR	23	I	power-on reset input
MUXSWICH	24	I	use clock multiplier input
n.c.	25	–	not connected, reserved
CL1	26	O	divided clock output
BCAIN	27	I	BCA input
SDA	28	I/O	sub-CPU I^2C-bus serial data input/output
SCL	29	I	sub-CPU I^2C-bus serial clock input
INT	30	O	sub-CPU interrupt output (open-drain)
V_{DDD3}	31	supply	digital supply voltage 3
V_{SSD3}	32	supply	digital ground 3
da7	33	I/O	sub-CPU data bus bit 7 input/output (parallel)
da6	34	I/O	sub-CPU data bus bit 6 input/output (parallel)
da5	35	I/O	sub-CPU data bus bit 5 input/output (parallel)
n.c.	36	–	not connected, reserved
da4	37	I/O	sub-CPU data bus bit 4 input/output (parallel)
n.c.	38	–	not connected, reserved
da3	39	I/O	sub-CPU data bus bit 3 input/output (parallel)
da2	40	I/O	sub-CPU data bus bit 2 input/output (parallel)

SYMBOL	PIN	TYPE	DESCRIPTION
da1	41	I/O	sub-CPU data bus bit 1 input/output (parallel)
n.c.	42	–	not connected, reserved
da0	43	I/O	sub-CPU data bus bit 0 input/output (parallel)
V_{DDD4}	44	supply	digital supply voltage 4
V_{SSD4}	45	supply	digital ground 4
$\overline{\text{WR}}$i	46	I	sub-CPU write enable input (active LOW)
$\overline{\text{RD}}$i	47	I	sub-CPU read enable input (active LOW)
ALE	48	I	sub-CPU address latch enable input
CSi	49	I	sub-CPU chip select input (active HIGH)
STOPCLOCK	50	O	stop clock output
n.c.	51	–	not connected, reserved
V4	52	O	serial subcode output (for CD)
EBUOUT	53	O	digital audio output
SYNC	54	O	I^2S-bus sector sync output
FLAG	55	O	I^2S-bus correction flag output
DATA	56	O	I^2S-bus serial data output
BCLK	57	I/O	I^2S-bus bit serial clock input/output
WCLK	58	I/O	I^2S-bus word clock input/output
V_{DDD5}	59	supply	digital supply voltage 5
V_{SSD5}	60	supply	digital ground 5
RAMRW	61	O	RAM read/write control output
n.c.	62	–	not connected, reserved
RAMDA7	63	I/O	RAM data bus bit 7 input/output
RAMDA6	64	I/O	RAM data bus bit 6 input/output
RAMDA5	65	I/O	RAM data bus bit 5 input/output
RAMDA4	66	I/O	RAM data bus bit 4 input/output
RAMDA3	67	I/O	RAM data bus bit 3 input/output
RAMDA2	68	I/O	RAM data bus bit 2 input/output
n.c.	69	–	not connected, reserved
RAMDA1	70	I/O	RAM data bus bit 1 input/output
RAMDA0	71	I/O	RAM data bus bit 0 input/output
V_{DDD6}	72	supply	digital supply voltage 6
V_{SSD6}	73	supply	digital ground 6
RAMAD0	74	O	RAM address bit 0 output
RAMAD1	75	O	RAM address bit 1 output
RAMAD2	76	O	RAM address bit 2 output
RAMAD3	77	O	RAM address bit 3 output
RAMAD4	78	O	RAM address bit 4 output
RAMAD5	79	O	RAM address bit 5 output
RAMAD6	80	O	RAM address bit 6 output
V_{DDD7}	81	supply	digital supply voltage 7

SYMBOL	PIN	TYPE	DESCRIPTION
V_{SSD7}	82	supply	digital ground 7
RAMAD7	83	O	RAM address bit 7 output
RAMAD8	84	O	RAM address bit 8 output
RAMAD9	85	O	RAM address bit 9 output
n.c.	86	–	not connected, reserved
RAMAD10	87	O	RAM address bit 10 output
RAMAD11	88	O	RAM address bit 11 output
RAMAD12	89	O	RAM address bit 12 output
RAMAD13	90	O	RAM address bit 13 output
RAMAD14	91	O	RAM address bit 14 output
V_{DDD8}	92	supply	digital supply voltage 8
V_{SSD8}	93	supply	digital ground 8
CRIN	94	I	analog crystal input
CROUT	95	O	analog crystal output
CFLG	96	O	correction statistics output
MEAS1	97	O	front-end telemetry output
V_{DDD9}	98	supply	digital supply voltage 9
V_{SSD9}	99	supply	digital ground 9
V_{DDA1}	100	supply	analog supply voltage 1

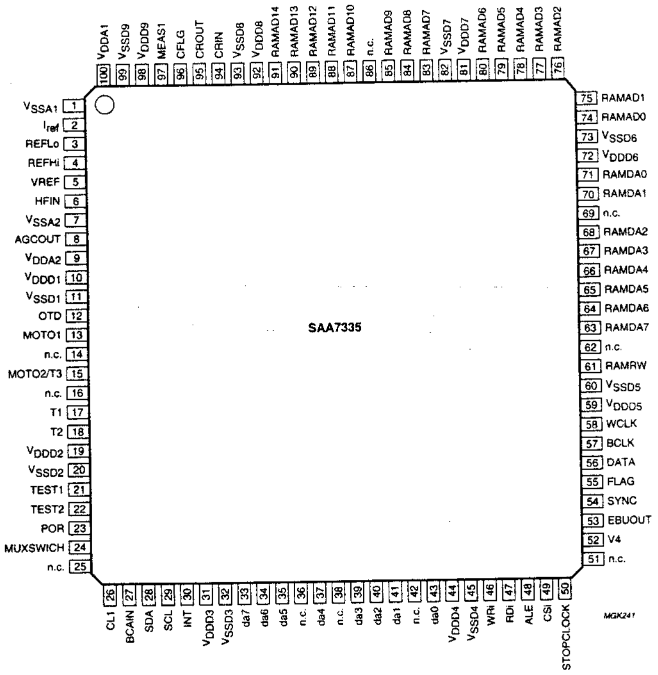

V_{SSA1} 1
I_{ref} 2
REFLo 3
REFHi 4
VREF 5
HFIN 6
V_{SSA2} 7
AGCOUT 8
V_{DDA2} 9
V_{DDD1} 10
V_{SSD1} 11
OTD 12
MOTO1 13
n.c. 14
MOTO2/T3 15
n.c. 16
T1 17
T2 18
V_{DDD2} 19
V_{SSD2} 20
TEST1 21
TEST2 22
POR 23
MUXSWICH 24
n.c. 25
26 CL1
27 BCAIN
28 SDA
29 SCL
30 INT
31 V_{DDD3}
32 V_{SSD3}
33 da7
34 da6
35 da5
36 n.c.
37 da4
38 n.c.
39 da3
40 da2
41 da1
42 n.c.
43 da0
44 V_{DDD4}
45 V_{SSD4}
46 WRi
47 RDi
48 ALE
49 CSi
50 STOPCLOCK
51 n.c.
52 V4
53 EBUOUT
54 SYNC
55 FLAG
56 DATA
57 BCLK
58 WCLK
59 V_{DDD5}
60 V_{SSD5}
61 RAMRW
62 n.c.
63 RAMDA7
64 RAMDA6
65 RAMDA5
66 RAMDA4
67 RAMDA3
68 RAMDA2
69 n.c.
70 RAMDA1
71 RAMDA0
72 V_{DDD6}
73 V_{SSD6}
74 RAMAD0
75 RAMAD1
76 RAMAD2
77 RAMAD3
78 RAMAD4
79 RAMAD5
80 RAMAD6
81 V_{DDD7}
82 V_{SSD7}
83 RAMAD7
84 RAMAD8
85 RAMAD9
86 n.c.
87 RAMAD10
88 RAMAD11
89 RAMAD12
90 RAMAD13
91 RAMAD14
92 V_{DDD8}
93 V_{SSD8}
94 CRIN
95 CROUT
96 CFLG
97 MEAS1
98 V_{DDD9}
99 V_{SSD9}
100 V_{DDA1}
SAA7335
MGK241

Fig.2 Pin configuration.

FUNCTIONAL DESCRIPTION

Analog front-end

This block converts the HF input to the digital domain using an 8-bit ADC proceeded by an AGC circuit to obtain the optimum performance from the convertor. This block is clocked by ADCCLK which is set by the external crystal frequency plus a flexible clock multiplier and divider block.

PLL and bit detector

This subsystem recovers the data from the channel stream. The block corrects asymmetry, performs noise filtering and equalisation and finally recovers the bit clock and data from the channel using a digital PLL.

The equalizer and the data slicer are programmable.

Digital logic

All the digital system logic is clocked from the master ADC clock (ADCCLK) described above.

Advanced bit detector

The advanced bit detector offers improved data recovery for multi-layer discs and contains two extra detection circuits to increase the margins in the bit recovery block:

1. Adaptive slicer: adds a second stage slicer with higher bandwidth
2. Run length 2 push-back: all T2 run lengths are pushed back to T3, thereby automatically determining the erroneous edge and shifting the transitions on that edge.

Demodulator

FRAME SYNC PROTECTION CD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 588 ±1 EFM clocks apart.
2. The main counter: this is used to partition the EFM signal into 17-bit words. This counter is reset when:
   a) A sync coincidence is generated
   b) A sync is found within ±6 EFM clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

FRAME SYNC PROTECTION DVD MODE

This circuit detects the frame synchronization signals. Two synchronization counters are used in the SAA7335:

1. The coincidence counter: this is used to detect the coincidence of successive syncs. It generates a sync coincidence signal if 2 syncs are 1488 ±3 EFM+ clocks apart.
2. The main counter: this is used to partition the EFM+ signal into 16-bit words. This counter is reset when:
   a) A sync coincidence is generated
   b) A sync is found within ±10 EFM+ clocks of its expected position.

The sync coincidence signal is also used to generate the lock signal which will go active HIGH when 1 sync coincidence is found. It will reset to LOW when, during 61 consecutive frames, no sync coincidence is found.

EFM/EFM+ demodulation

The 14-bit EFM (16-bit EFM+) data and subcode words are decoded into 8-bit symbols.

Microcontroller interface

The SAA7335 has two microcontroller interfaces, one serial I^2C-bus and one parallel (8051 microcontroller compatible).

The two communication modes may be operated at the same time, the modes are described below:

1. Parallel mode: protocol compatible with 8052 multiplexed bus:
   a) da0 to da7 = address/data bus
   b) ALE = Address Latch Enable, latches the address information on the bus
   c) $\overline{\text{WRi}}$ = active LOW write signal for write to SAA7335
   d) $\overline{\text{RDi}}$ = active LOW read signal for read from SAA7335
   e) CSi = active HIGH Chip Select signal (this signal gates the $\overline{\text{RDi}}$ and $\overline{\text{WRi}}$ signals).
2. I^2C-bus mode: I^2C-bus protocol where SAA7335 behaves as slave device where:
   a) SDA = I^2C-bus data
   b) SCL = I^2C-bus clock
   c) I^2C-bus slave address (write mode) = 3EH
   d) I^2C-bus slave address (read mode) = 3FH
   e) Maximum data transfer rate = 400 kbits/s.

MICROCONTROLLER INTERFACE (I^2C-BUS MODE)

Bytes are transferred over the interface in single bytes of which there are two types; write data commands and read data commands.

The sequence for a write data command (1 data byte) is as follows:

- Send START condition
- Send address 3EH (write)
- Write command address byte
- Write data byte
- Send STOP condition.

The sequence for a read data command (that reads 1 data byte) is as follows:

- Send START condition
- Send address 3EH (write)
- Write status address byte
- Send STOP condition
- Send START condition
- Send address 3FH (read)
- Read data byte
- Send STOP condition.

READING AND WRITING DATA TO THE SAA7335

The SAA7335 has 32 × 8-bit configuration and status registers as shown in Table 1. Not all locations are currently defined and some remain reserved for future upgrades. These can be written to or read from via the microcontroller interface using either the serial or parallel control bus.

Am29LV160BT/Am29LV160BB

16 Megabit (2 M x 8-Bit/1 M x 16-Bit)
CMOS 3.0 Volt-only Sector Erase Flash Memory

DISTINCTIVE CHARACTERISTICS

- **Single power supply operation**
  - Full voltage range: 2.7 to 3.6 volt read and write operations for battery-powered applications
  - Regulated voltage range: 3.0 to 3.6 volt read and write operations and for compatibility with high performance 3.3 volt microprocessors
- **Manufactured on 0.35 µm process technology**
- **Supports Common Flash Memory Interface (CFI)**
- **High performance**
  - Full voltage range: access times as fast as 90 ns
  - Regulated voltage range: access times as fast as 80 ns
- **Ultra low power consumption (typical values at 5 MHz)**
  - 200 nA Automatic Sleep mode current
  - 200 nA standby mode current
  - 10 mA read current
  - 20 mA program/erase current
- **Flexible sector architecture**
  - One 16 Kbyte, two 8 Kbyte, one 32 Kbyte, and thirty-one 64 Kbyte sectors (byte mode)
  - One 8 Kword, two 4 Kword, one 16 Kword, and thirty-one 32 Kword sectors (word mode)
  - Supports full chip erase
  - Sector Protection features:

    A hardware method of locking a sector to prevent any program or erase operations within that sector

    Sectors can be locked in-system or via programming equipment

    Temporary Sector Unprotect feature allows code changes in previously locked sectors
- **Top or bottom boot block configurations available**
- **Embedded Algorithms**
  - Embedded Erase algorithm automatically preprograms and erases the entire chip or any combination of designated sectors
  - Embedded Program algorithm automatically writes and verifies data at specified addresses
- **Minimum 100,000 write cycle guarantee per sector**
- **Package option**
  - 48-ball FBGA
  - 48-ball µBGA
  - 48-pin TSOP
  - 44-pin SO
- **Compatibility with JEDEC standards**
  - Pinout and software compatible with single-power supply Flash
  - Superior inadvertent write protection
- **Data# Polling and toggle bits**
  - Provides a software method of detecting program or erase operation completion
- **Ready/Busy# pin (RY/BY#)**
  - Provides a hardware method of detecting program or erase cycle completion (not available on 44-pin SO)
- **Erase Suspend/Erase Resume**
  - Suspends an erase operation to read data from, or program data to, a sector that is not being erased, then resumes the erase operation
- **Hardware reset pin (RESET#)**
  - Hardware method to reset the device to reading array data

GENERAL DESCRIPTION

The Am29LV160B is a 16 Mbit, 3.0 Volt-only Flash memory organized as 2,097,152 bytes or 1,048,576 words. The device is offered in 48-ball FBGA, 48-ball µBGA, 44-pin SO, and 48-pin TSOP packages. The word-wide data (x16) appears on DQ15–DQ0; the byte-wide (x8) data appears on DQ7–DQ0. This device is designed to be programmed in-system with the standard system 3.0 volt V_{CC} supply. A 12.0 V V_{PP} or 5.0 V_{CC} are not required for write or erase operations. The device can also be programmed in standard EPROM programmers.

The device offers access times of 80, 90, and 120 ns, allowing high speed microprocessors to operate without wait states. To eliminate bus contention the device has separate chip enable (CE#), write enable (WE#) and output enable (OE#) controls.

The device requires only a **single 3.0 volt power supply** for both read and write functions. Internally generated and regulated voltages are provided for the program and erase operations.

The Am29LV160B is entirely command set compatible with the **JEDEC single-power-supply Flash standard**. Commands are written to the command register using standard microprocessor write timings. Register contents serve as input to an internal state-machine that controls the erase and programming circuitry. Write cycles also internally latch addresses and data needed for the programming and erase operations. Reading data out of the device is similar to reading from other Flash or EPROM devices.

Device programming occurs by executing the program command sequence. This initiates the **Embedded Program** algorithm—an internal algorithm that automatically times the program pulse widths and verifies proper cell margin. The **Unlock Bypass** mode facilitates faster programming times by requiring only two write cycles to program data instead of four.

Device erasure occurs by executing the erase command sequence. This initiates the **Embedded Erase** algorithm—an internal algorithm that automatically preprograms the array (if it is not already programmed) before executing the erase operation. During erase, the device automatically times the erase pulse widths and verifies proper cell margin.

The host system can detect whether a program or erase operation is complete by observing the RY/BY# pin, or by reading the DQ7 (Data# Polling) and DQ6 (toggle) **status bits**. After a program or erase cycle has been completed, the device is ready to read array data or accept another command.

The **sector erase architecture** allows memory sectors to be erased and reprogrammed without affecting the data contents of other sectors. The device is fully erased when shipped from the factory.

Hardware data protection measures include a low V_{CC} detector that automatically inhibits write operations during power transitions. The **hardware sector protection** feature disables both program and erase operations in any combination of the sectors of memory. This can be achieved in-system or via programming equipment.

The **Erase Suspend/Erase Resume** feature enables the user to put erase on hold for any period of time to read data from, or program data to, any sector that is not selected for erasure. True background erase can thus be achieved.

The **hardware RESET# pin** terminates any operation in progress and resets the internal state machine to reading array data. The RESET# pin may be tied to the system reset circuitry. A system reset would thus also reset the device, enabling the system microprocessor to read the boot-up firmware from the Flash memory.

The device offers two power-saving features. When addresses have been stable for a specified amount of time, the device enters the **automatic sleep mode**. The system can also place the device into the **standby mode**. Power consumption is greatly reduced in both these modes.

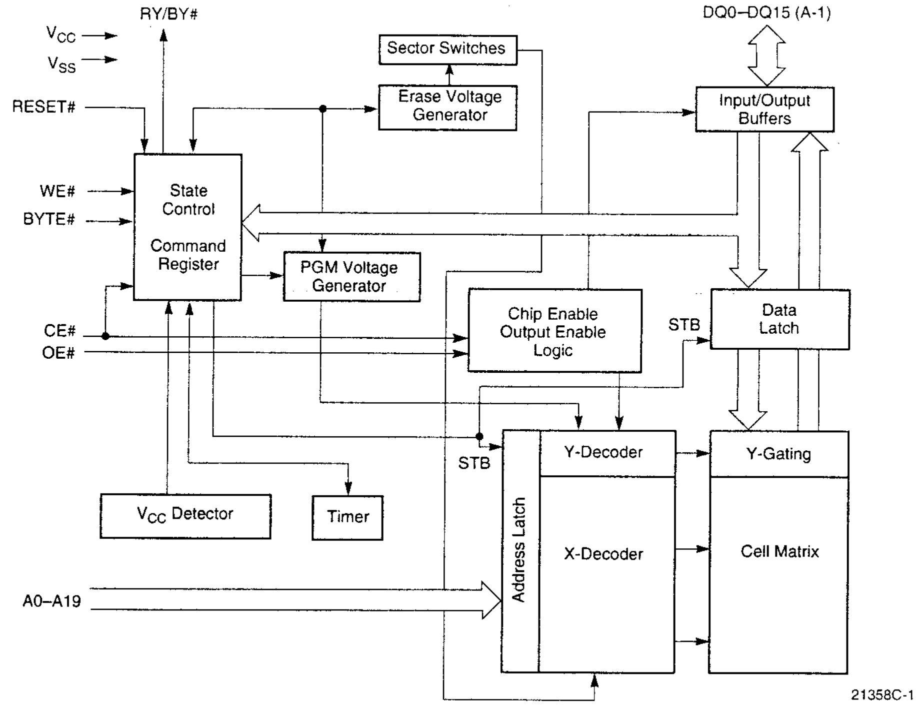
AMD's Flash technology combines years of Flash memory manufacturing experience to produce the highest levels of quality, reliability and cost effectiveness. The device electrically erases all bits within a sector simultaneously via Fowler-Nordheim tunneling. The data is programmed using hot electron injection.

PRODUCT SELECTOR GUIDE

Family Part Number	Am29LV160B		
Ordering Part Number: V_{CC} =3.0–3.6 V	**80R**		
V_{CC} = 2.7–3.6 V		**90**	**120**
Max access time, ns (t_{ACC})	80	90	120
Max CE# access time, ns (t_{CE})	80	90	120
Max OE# access time, ns (t_{OE})	30	35	50

Note: *See "AC Characteristics" for full specifications.*

BLOCK DIAGRAM



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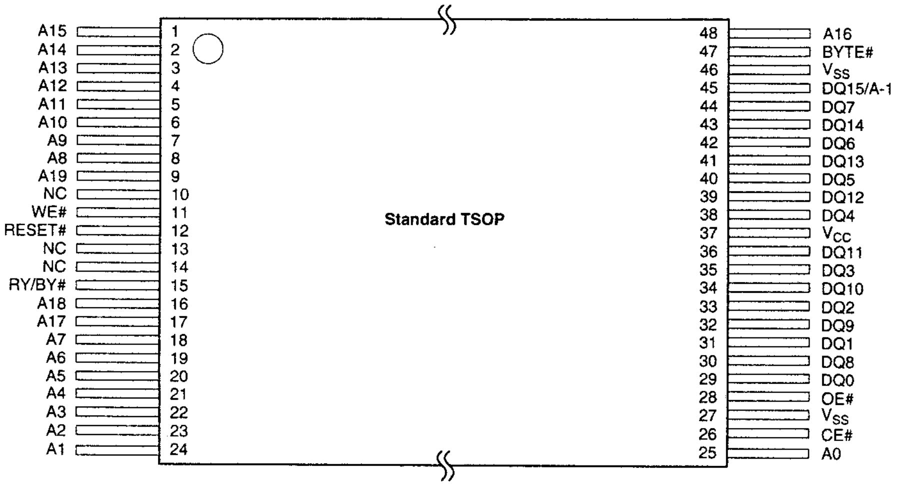
CONNECTION DIAGRAMS


Standard TSOP
A15 1
A14 2
A13 3
A12 4
A11 5
A10 6
A9 7
A8 8
A19 9
NC 10
WE# 11
RESET# 12
NC 13
NC 14
RY/BY# 15
A18 16
A17 17
A7 18
A6 19
A5 20
A4 21
A3 22
A2 23
A1 24
48 A16
47 BYTE#
46 VSS
45 DQ15/A-1
44 DQ7
43 DQ14
42 DQ6
41 DQ13
40 DQ5
39 DQ12
38 DQ4
37 VCC
36 DQ11
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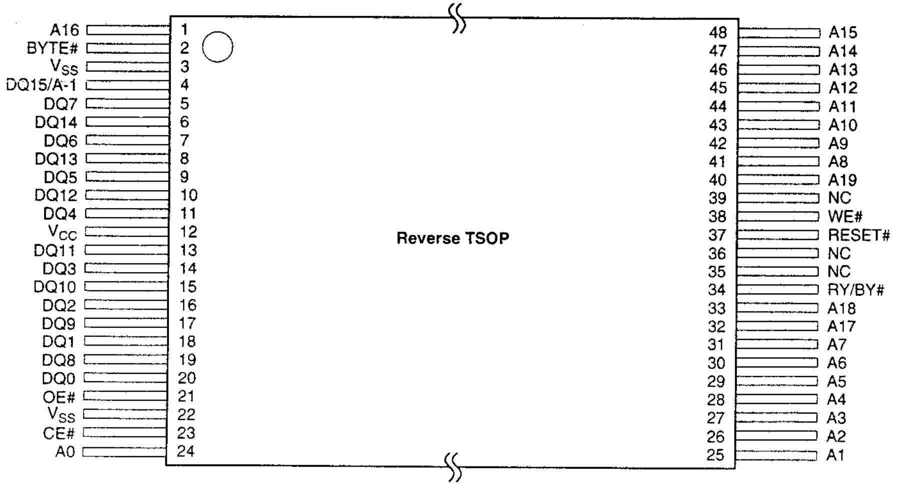
33 DQ2
32 DQ9
31 DQ1
30 DQ8
29 DQ0
28 OE#
27 VSS
26 CE#
25 A0


Reverse TSOP
A16 1
BYTE# 2
VSS 3
DQ15/A-1 4
DQ7 5
DQ14 6
DQ6 7
DQ13 8
DQ5 9
DQ12 10
DQ4 11
VCC 12
DQ11 13
DQ3 14
DQ10 15
DQ2 16
DQ9 17
DQ1 18
DQ8 19
DQ0 20
OE# 21
VSS 22
CE# 23
A0 24
48 A15
47 A14
46 A13
45 A12
44 A11
43 A10
42 A9
41 A8
40 A19
39 NC
38 WE#
37 RESET#
36 NC
35 NC
34 RY/BY#
33 A18
32 A17
31 A7
30 A6
29 A5
28 A4
27 A3
26 A2
25 A1

21358C-2

SYNCHRONOUS DRAM

MT48LC1M16A1 S - 512K x 16 x 2 banks

FEATURES

- PC100 functionality
- Fully synchronous; all signals registered on positive edge of system clock
- Internal pipelined operation; column address can be changed every clock cycle
- Internal banks for hiding row access/precharge
  1 Meg x 16 - 512K x 16 x 2 banks architecture with 11 row, 8 column addresses per bank
- Programmable burst lengths: 1, 2, 4, 8 or full page
- Auto Precharge Mode, includes CONCURRENT AUTO PRECHARGE
- Self Refresh and Adaptable Auto Refresh Modes
  - 32ms, 2,048-cycle refresh or
  - 64ms, 2,048-cycle refresh or
  - 64ms, 4,096-cycle refresh
- LVTTL-compatible inputs and outputs
- Single +3.3V ±0.3V power supply
- Supports CAS latency of 1, 2 and 3

OPTIONS	MARKING
• Configuration	
1 Meg x 16 (512K x 16 x 2 banks)	1M16A1
• Plastic Package - OCPL*	
50-pin TSOP (400 mil)	TG
• Timing (Cycle Time)	
6ns (166 MHz)	-6
7ns (143 MHz)	-7
8ns (125 MHz)	-8A
• Refresh	
2K or 4K with Self Refresh Mode at 64ms	S

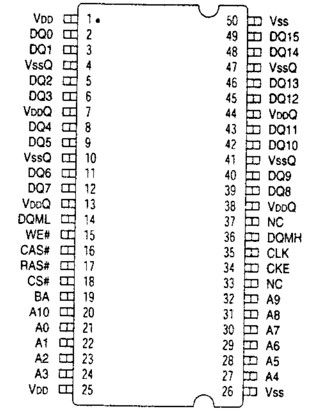
- Part Number Example: MT48LC1M16A1TG-7S

KEY TIMING PARAMETERS

SPEED	CLOCK	ACCESS TIME CL = 3**	SETUP	HOLD
-6	166 MHz	5.5ns	2ns	1ns
-7	143 MHz	5.5ns	2ns	1ns
-8A	125 MHz	6ns	2ns	1ns

*Off-center parting line
**CL = CAS (READ) latency

PIN ASSIGNMENT (Top View)
50-Pin TSOP


VDD 1
DQ0 2
DQ1 3
VssQ 4
DQ2 5
DQ3 6
VDDQ 7
DQ4 8
DQ5 9
VssQ 10
DQ6 11
DQ7 12
VDDQ 13
DQML 14
WE# 15
CAS# 16
RAS# 17
CS# 18
BA 19
A10 20
A0 21
A1 22
A2 23
A3 24
VDD 25
50 Vss
49 DQ15
48 DQ14
47 VssQ
46 DQ13
45 DQ12
44 VDDQ
43 DQ11
42 DQ10
41 VssQ
40 DQ9
39 DQ8
38 VDDQ
37 NC
36 DQMH
35 CLK
34 CKE
33 NC
32 A9
31 A8
30 A7
29 A6
28 A5
27 A4
26 Vss

Note: The # symbol indicates signal is active LOW.

	1 Meg x 16
Configuration	512K x 16 x 2 banks
Refresh Count	2K or 4K
Row Addressing	2K (A0 A10)
Bank Addressing	2 (BA)
Column Addressing	256 (A0 A7)

16Mb (x16) SDRAM PART NUMBER

PART NUMBER	ARCHITECTURE
MT48LC1M16A1TG S	1 Meg x 16

GENERAL DESCRIPTION

The 16Mb SDRAM is a high-speed CMOS, dynamic random-access memory containing 16,777,216 bits. It is internally configured as a dual 512K x 16 DRAM with a synchronous interface (all signals are registered on the positive edge of the clock signal, CLK). Each of the 512K x 16-bit banks is organized as 2,048 rows by 256 columns by 16 bits. Read and write accesses to the SDRAM are burst oriented; accesses start at a selected location and continue for a programmed number of locations in a programmed

GENERAL DESCRIPTION (continued)

sequence. Accesses begin with the registration of an ACTIVE command, which is then followed by a READ or WRITE command. The address bits registered coincident with the ACTIVE command are used to select the bank and row to be accessed (BA selects the bank, A0-A10 select the row). The address bits registered coincident with the READ or WRITE command are used to select the starting column location for the burst access.

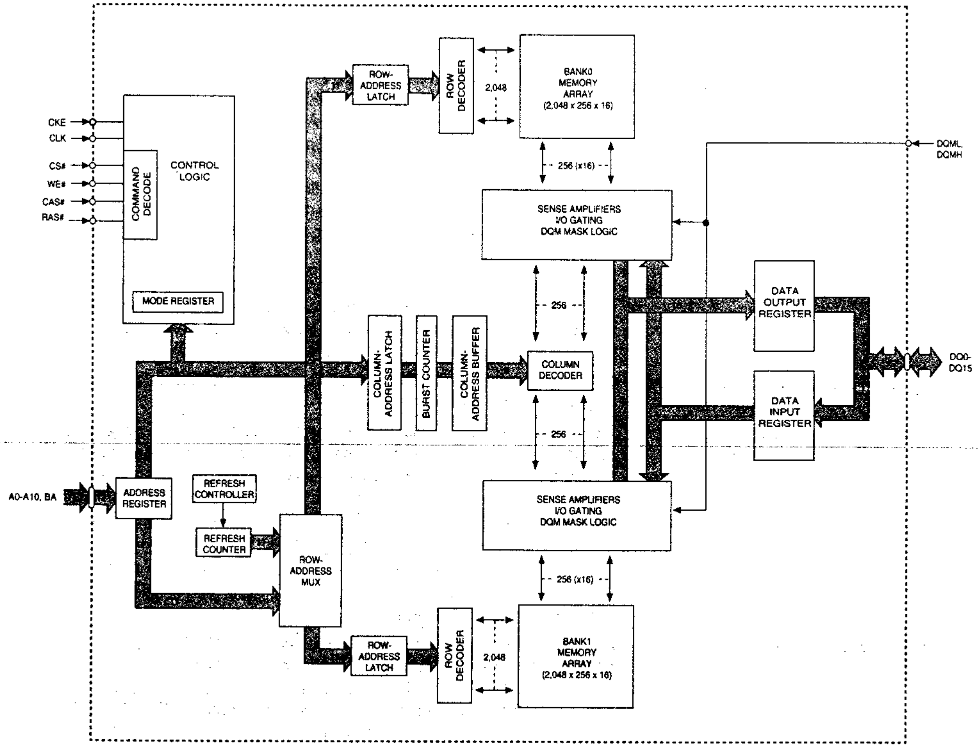
The SDRAM provides for programmable READ or WRITE burst lengths of 1, 2, 4 or 8 locations, or the full page, with a burst terminate option. An AUTO PRECHARGE function may be enabled to provide a self-timed row precharge that is initiated at the end of the burst sequence.

The 1 Meg x 16 SDRAM uses an internal pipelined architecture to achieve high-speed operation. This architecture is compatible with the 2n rule of prefetch architectures, but it also allows the column address to be changed on every clock cycle to achieve a high-speed, fully random access. Precharging one bank while accessing the alternate bank will hide the PRECHARGE cycles and provide seamless, high-speed, random-access operation.

The 1 Meg x 16 SDRAM is designed to operate in 3.3V, low-power memory systems. An auto refresh mode is provided, along with a power-saving, power-down mode. All inputs and outputs are LVTTL-compatible.

SDRAMs offer substantial advances in DRAM operating performance, including the ability to synchronously burst data at a high data rate with automatic column-address generation, the ability to interleave between internal banks in order to hide precharge time, and the capability to randomly change column addresses on each clock cycle during a burst access.

FUNCTIONAL BLOCK DIAGRAM
1 Meg x 16 SDRAM


CKE
CLK
CS#
WE#
CAS#
RAS#
COMMAND DECODE
CONTROL LOGIC
MODE REGISTER
A0-A10, BA
ADDRESS REGISTER
REFRESH CONTROLLER
REFRESH COUNTER
ROW-ADDRESS MUX
ROW-ADDRESS LATCH
ROW DECODER
2,048
BANK0 MEMORY ARRAY (2,048 x 256 x 16)
256 (x16)
SENSE AMPLIFIERS I/O GATING DQM MASK LOGIC
256
COLUMN-ADDRESS LATCH
BURST COUNTER
COLUMN-ADDRESS BUFFER
COLUMN DECODER
256
SENSE AMPLIFIERS I/O GATING DQM MASK LOGIC
256 (x16)
ROW-ADDRESS LATCH
ROW DECODER
2,048
BANK1 MEMORY ARRAY (2,048 x 256 x 16)
DQML, DQMH
DATA OUTPUT REGISTER
DATA INPUT REGISTER
DQ0-DQ15

16Mb: x16
SDRAM

PIN DESCRIPTIONS

PIN NUMBERS	SYMBOL	TYPE	DESCRIPTION
35	CLK	Input	Clock: CLK is driven by the system clock. All SDRAM input signals are sampled on the positive edge of CLK. CLK also increments the internal burst counter and controls the output registers.
34	CKE	Input	Clock Enable: CKE activates (HIGH) and deactivates (LOW) the CLK signal. Deactivating the clock provides PRECHARGE POWER-DOWN and SELF REFRESH operations (all banks idle), ACTIVE POWER-DOWN (row ACTIVE in either bank) or CLOCK SUSPEND operation (burst/access in progress). CKE is synchronous except after the device enters power-down and self refresh modes, where CKE becomes asynchronous until after exiting the same mode. The input buffers, including CLK, are disabled during power-down and self refresh modes, providing low standby power. CKE may be tied HIGH.
18	CS#	Input	Chip Select: CS# enables (registered LOW) and disables (registered HIGH) the command decoder. All commands are masked when CS# is registered HIGH. CS# provides for external bank selection on systems with multiple banks. CS# is considered part of the command code.
15, 16, 17	WE#, CAS#, RAS#	Input	Command Inputs: RAS#, CAS# and WE# (along with CS#) define the command being entered.
14, 36	DQML, DQMH	Input	Input/Output Mask: DQM is an input mask signal for write accesses and an output enable signal for read accesses. Input data is masked when DQM is sampled HIGH during a WRITE cycle. The output buffers are placed in a High-Z state (two-clock latency) when DQM is sampled HIGH during a READ cycle. DQML corresponds to DQ0-DQ7; DQMH corresponds to DQ8-DQ15. DQML and DQMH are considered same state when referenced as DQM.
19	BA	Input	Bank Address Inputs: BA defines to which bank the ACTIVE, READ, WRITE or PRECHARGE command is being applied. BA is also used to program the twelfth bit of the Mode Register.
21-24, 27-32, 20	A0-A10	Input	Address Inputs: A0-A10 are sampled during the ACTIVE command (row-address A0-A10) and READ/WRITE command (column-address A0-A7, with A10 defining AUTO PRECHARGE) to select one location out of the 512K available in the respective bank. A10 is sampled during a PRECHARGE command to determine if all banks are to be precharged (A10 HIGH). The address inputs also provide the op-code during a LOAD MODE REGISTER command.
2, 3, 5, 6, 8, 9, 11, 12, 39, 40, 42, 43, 45, 46, 48, 49	DQ0-DQ15	Input/ Output	Data I/Os: Data bus.
33, 37	NC	–	No Connect: These pins should be left unconnected.
7, 13, 38, 44	VDDQ	Supply	DQ Power: Provide isolated power to DQs for improved noise immunity.
4, 10, 41, 47	VSSQ	Supply	DQ Ground: Provide isolated ground to DQs for improved noise immunity.
[illegible]	VDD	Supply	Power Supply: +3.3V ±0.3V.
26, 50	Vss	Supply	Ground.

STi5505 (Rev. Ax)

DVD BACKEND DECODER WITH INTEGRATED HOST PROCESSOR

PRODUCT PREVIEW

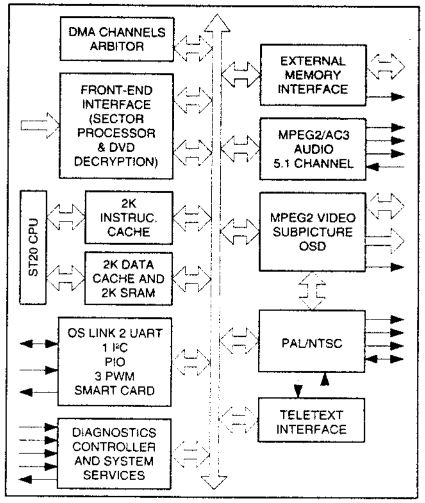
- INTEGRATED 32-BIT RISC HOST CPU
  - 2KBYTES INSTRUCTION CACHE, 2KBYTES DATA CACHE/SRAM
  - 50K DHRYSTONES/SEC (2.1) - 50MHz
- VIDEO DECODER
  - FULLY SUPPORTS MPEG-2 MP@ML
  - MEMORY REDUCTION - PAL IN 12MBITS
- SUBPICTURE DECODER
- HIGH PERFORMANCE ON-SCREEN DISPLAY
- AUDIO DECODER
  - 5.1 CHANNEL DOLBY AC-3® / MULTI CHANNEL MPEG-2 DECODING
  - DOWNMIX TO STEREO OR TO DOLBY PRO-LOGIC COMPATIBLE OUTPUTS FOR MPEG-2 AND AC-3
  - IEC6958 - IEC61937 COMPATIBLE OUTPUT
  - LPCM (DVD) MODE SUPPORTED
  - 6 CHANNELS OUTPUT
- PAL/NTSC ENCODER
  - MACROVISION™ 7.01/6.1 COMPATIBLE
  - TELETEXT, AND CLOSED CAPTION
- HIGH PERFORMANCE SDRAM INTERFACE
- PROGRAMMABLE MEMORY INTERFACE FOR DRAM, ROM, PERIPHERALS ETC.
- FRONT-END CHANNEL IC INTERFACE
  - DVD, VCD AND CD-DA COMPATIBLE
  - DSS - DVB BISTREAMS
  - SERIAL AND PARALLEL INTERFACES
  - HARDWARE SECTOR FILTERING
  - INTEGRATED CSS DECRYPTION AND TRACK BUFFER
- INTEGRATED PERIPHERALS
  - 2 UARTS, 1 I²C CONTROLLER, 3 PWM OUTPUTS, 3 TIMERS, 3 CAPTURE TIMERS, SMART CARD
  - 34 BITS OF PROGRAMMABLE I/O
  - OS LINK
- PROFESSIONAL TOOLSET SUPPORT
  - ANSI C COMPILER AND LIBRARIES
  - OPERATING SYSTEMS SUPPORT
  - ADVANCED DEBUGGING TOOLS
- 208 PIN PQFP PACKAGE

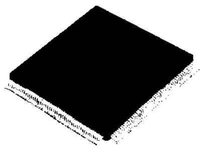
DESCRIPTION

The STi5505 provides a very highly integrated back-end solution for DVD and combo DVD-DVB (Set Top Box) applications. The STi5505 incorporates a host CPU which handles both general application (DVD navigation, CD-DA, VCD, DVB) and drivers of the different embedded periphals (audio/video, subpicture decoders, OSD, PAL/NTSC encoder...).

The STi5505 offers one of the best cost-effective (memory savings, internal peripherals availability) solution to DVD-DVB applications with rapid time to market (Reference design, DVD-DVB Software Toolkit).

Figure 1 : General Block Diagram


DMA CHANNELS ARBITOR
FRONT-END INTERFACE (SECTOR PROCESSOR & DVD DECRYPTION)
ST20 CPU
2K INSTRUC. CACHE
2K DATA CACHE AND 2K SRAM
OS LINK 2 UART 1 I²C PIO 3 PWM SMART CARD
DIAGNOSTICS CONTROLLER AND SYSTEM SERVICES
EXTERNAL MEMORY INTERFACE
MPEG2/AC3 AUDIO 5.1 CHANNEL
MPEG2 VIDEO SUBPICTURE OSD
PAL/NTSC
TELETEXT INTERFACE



PQFP208 (Plastic Quad Flat Pack)
ORDER CODE : STi5505ACV

I - GENERAL DESCRIPTION

The performance offered by the ST20 CPU and its associated hardware (decoders, encoder, peripherals...) allows an integrated and unified DVD or DVD-DVB software solution.

All the following operations are performed inside the STi5505 :

- application management (DVD Navigation, VCD, CD-DA, DVB-Program Guide ...),
- device data retrieval drivers (demultiplex, stream buffer management ...),
- device presentation drivers (video decoder, subpicture decoder, on-screen display, audio decoder, PAL/NTSC encoder ...),
- embedded peripherals drivers (UART, I^{2}C, Programmable I/O, Smart Card ...).

I.1 - ST20 32-bit CPU

The ST20 micro-core family has been developped by SGS-THOMSON Microelectronics to provide the tools and building blocks to enable the development of highly integrated application-specific 32-bits device at the lowest cost and fastest time to market.

The STi5505 integrates a ST20 C2 core with the following characteristics :

- 50K Dhrystones/s at 50MHz,
- 8/16 bits instructions (32 most common instructions in 8 bits),
- instruction cache 2Kbytes - write back replacement policy,
- internal SRAM 2Kbytes to ensure fast access to critical code, data, interrupt handler ...
- data cache 2 Kbytes - write back replacement policy,

The STi5505's ST20 is provided with advanced debugging tools :

- on-chip real-time emulation,
- debugging with minimal impact on software and performance,
- non intrusive attachment to the host via JTAG (IEEE1149.1),
- no intrusion into the performance of the CPU core,
- no intrusion into user code space by a debug kernel,
- only 40bytes used for breakpoint handler.

I.2 - Video Decoder

The video decoder implemented in the STi5505 uses a patented memory reduction/bandwith reduction scheme to offer the user the best bandwidth/memory size compromise.

The algorithm is lossless and uses "on-the-fly" decoding to reduce the memory requirements to two frame buffers in memory reduction mode.

In this mode, PAL decoding is contained in 12Mbits. When used in bandwith reduction mode, the memory usage is the normal three buffers but the bandwith required by the decoder is significantly reduced compared to a classical implementation.

In summary, the features of the decoder are :

- MPEG-2 Main Profile/Main Level (MP@ML) support,
- MPEG-2 program streams, Packet Elementary streams and MPEG-1 system streams support,
- memory reduction architecture allowing sharing of single 16 Mbits SDRAM between MPEG decoding, micro and transport functions - memory expandable to 32 Mbits of SDRAM,
- letter box (16:9) filter,
- pan-scan, horizontal and vertical image resizing,
- automatic error concealment.

I.3 - Subpicture Decoder

The STi5505 has a hardware DVD compliant subpicture decoder. Subpicture units are copied by DMA into subpicture bit buffer.

The subpicture decoder can decode complete subpicture units without any interaction from the ST20.

The main subpicture decoder features are :

- up to 720x480 or 720x576 subpicture area,
- internal LUTs for Sub Picture, Highlight and PCI (4 bits color and contrast outputs),
- internal color LUT (4 bits from SP, HL, PCI to 24 Y,Cr,Cb bits) for SP color inputs to MPEG, OSD, SP mixer.

I.4 - Audio Decoder

The audio decoder cell is a fully compatible Dolby AC-3™ / MPEG-1/MPEG-2 decoder capable of decoding both 5.1 and 2 channel streams compatible with the DVD standard.

Downmix from 5.1 channels is supported for both Dolby and MPEG-2 streams. The output can be sent directly to external DACs or formatted for transmission in accordance with the IE6958 standard.

The decoder can also handle linear PCM in accordance with the DVD standard. An integrated downsampler is provided for conversion from 96 kHz to 48kHz.

I - GENERAL DESCRIPTION (continued)

The main features of the decoder core are :

- Decodes 5.1 Dolby AC-3 Digital surround,
- Output to 6 channels. Downmix modes : 1, 2, 3 or 4 channels for MPEG and AC-3 streams,
- Karaoke mode for DVD. MPEG-2 capable, AC-3 capable,
- MPEG-1, 2-channel audio decoder layers 1 and 2,
- MPEG-2, 6-channel audio decoder layer 2,
- PCM : transparent. downsampling 96 to 48 kHz,
- Accepts MPEG-2 PES stream format for : MPEG-2, MPEG-1, Dolby AC-3 and Linear PCM,
- IEC6958 Output Interface,
- CD-DA PCM format (subcode output in IEC6958 user data),
- Downmix for Dolby Pro Logic compatible outputs for AC-3 and MPEG-2 (Pro Logic encoder),
- Pro Logic decoder,
- PLL for Internal 44.1 and 48kHz PCM clock generation,
- On chip pink noise generator.

I.5 - High Performance On-Screen Display

The graphics performance of the STi5505 supports the new requirements for intelligent program guides and interactive applications.

The display interface supports up to 256 colors for each OSD region and a transparency feature allows mixing of video with the OSD. Fast access graphics and many other additional features are available and are supported by a graphics library.

Very high system performance is obtained by closely coupling the ST20 RISC processor and cache with the MPEG audio/video core and display memory.

Low latency RISC access and DMA engines allow rapid construction of bit maps.

I.6 - PAL/NTSC Encoder

The STi5505 integrates a PAL/NTSC encoder. It converts the digital MPEG/Sub Picture/OSD stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. Six analog output pins are available on which it is possible to output CVBS, S-VHS (Y/C) and RGB formats.

The encoder handles interlaced and non-interlaced mode.

It can perform Closed Captions, CGMS or Teletext encoding and allows Macrovision 7.01/6.1 copy protection.

The encoder supports both master and slave modes for synchronization.

I.7 - Memory Interfaces

The STi5505 has been designed to minimize system costs by enabling various memory savings. Two kinds of memory interfaces are used on the STi5505 : a programmable External Memory Interface (EMI) and a high performance SDRAM interface.

The External Memory Interface supports several address ranges (memory banks). In each bank, a set of signals are entirely programmable and can be used to map 8/16 bits peripherals such as Front End channel ICs in DVD applications.

The EMI contains a zero glue logic DRAM and a low-cost EPROM interface.

This interface can be programmed to interface very easily peripherals.

The SDRAM memory interface supports gluelessly 125 MHz SDRAMs providing the adequate bandwiths to achieve MPEG decoding and display, OSD drawing and display, and general system use.

Memory savings can be realized on ROM requirements too : the ST20 VL-RISC micro-core has the highest code density of any 32 bit CPU, leading to the lowest cost program ROM.

I.8 - Front-End Interface

The STi5505 's front end interface accepts :

- DVD, VCD and CD-DA sectors,
- DVB-DSS transport stream.

In DVD mode, DVD, VCD and CD-DA information can be input into STi5505 through a serial interface or a generic parallel interface.

In serial mode, data are captured and filtered from I2S and V4 interfaces by an internal sector processor. V4 interface is used to capture VCD and CD-DA subcode information. In parallel mode, sector processor is bypassed.

I - GENERAL DESCRIPTION (continued)

The main features of the DVD interface are :

- DVD, VCD and CD-DA compatible,
- hardware sector filtering,
- subcode error correction for CD-DA,
- integrated CSS decryption,
- integrated track buffer support,
- DMA engine to ST20 memory.

In DVB-DSS mode, DVB-DSS transport stream is input through a serial interface. The STi5505 extracts and descrambles Packet Elementary Streams belonging to one user selected program to be decoded and presented.

The main features of the DVB-DSS interface are :

- descrambling (transport packet and packet elementary streams in DVB mode, transport packet in DSS mode ; up to 32 streams descrambling),
- PID and section filtering,
- clock recovery,
- DMA engine.

In DVB-DSS mode, a high speed digital interface allows to transfer packets between the Set Top Box and external units, either for recording or playback purposes. This interface provides also full support for an external IEEE1394 connection.

I.9 - Integrated Peripherals

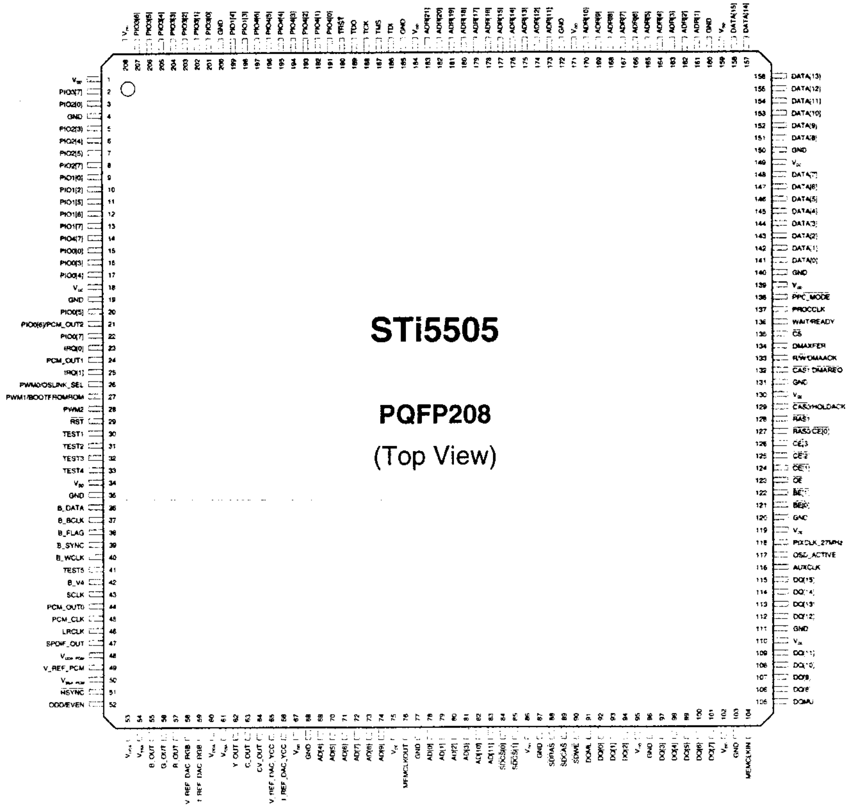
Several peripherals generally used in DVD players or DVD-DVB combos have been integrated into the STi5505.

They are :

- two UARTs to interface remote control receivers, DVD front end, modem ...,
- one I^{2}C controller to interface serial memories, remote control receivers, microcontrollers...,
- 2 SmartCard interfaces (ISO7816-3) for DVB-DSS conditionnal access, pay per view ...,
- PWM/timer module for control of system clock,
- 34 programmable I/O pins,
- OS Link interface,
- JTAG with boundary scan for debug.

II - PIN DESCRIPTION

II.1 - Pin Connections



II - PIN DESCRIPTION (continued)

II.2 - Pin List

Pin	Name	Type	Function
SUPPLIES			
1, 18, 34, 67, 75, 86, 95, 102, 110, 119, 130, 139, 149, 159, 171, 184, 208	V_{DD}		Power Supply
4, 19, 35, 68, 77, 87, 96, 103, 111, 120, 131, 140, 150, 160, 172, 185, 200	GND		Ground
53, 60	V_{DDA}		Analog Power Supply for DENC D/A Converters
54, 61	V_{SSA}		Analog Ground for DENC D/A Converters
48	V_{DDA_PCM}		Analog Power Supply for PLL PCM
49	V_REF_PCM		Analog Reference for PLL PCM
50	V_{SSA_PCM}		Analog Ground for PLL PCM
FRONT-END INTERFACE			
36	B_DATA	I	I^{2}S Data (DVD) or PARA_DATA[2] (DVD//) or Link Data (DVB/DSS)
40	B_WCLK	I/O	I^{2}S Word Clock or PARA_DATA[6] (DVD//) or NRSS_CLK (DVB/DSS)
37	B_BCLK	I	I^{2}S Bit Clock (DVD) or PARA_DATA[3] (DVD//) or Link Bit Clock (DVB/DSS)
38	B_FLAG	I	Error Flag (DVD) or PARA_DATA [4] (DVD//) or Link Sync (DVB/DSS)
39	B_SYNC	I	Sector / Abs Time Sync (DVD) or PARA_DATA[5] (DVD//) or Link Not Valid (DVB/DSS)
42	B_V4	I	Versatile Input Pin (Subcode Input) or PARA_DATA[7] (DVD//) or NRSS_IN (DVB/DSS)
VIDEO OUTPUT INTERFACE			
57	R_OUT	O	Red Output
56	G_OUT	O	Green Output
55	B_OUT	O	Blue Output
63	C_OUT	O	Chroma Output
64	CV_OUT	O	Composite Video Output
62	Y_OUT	O	Luma Output
59	I_REF_DAC_RGB	I	DAC Current Reference
66	I_REF_DAC_YCC	I	DAC Current Reference
58	V_REF_DAC_RGB	I	DAC Voltage Reference
65	V_REF_DAC_YCC	I	DAC Voltage Reference
117	OSD_ACTIVE	I/O	OSD Active
118	PIXCLK_27MHz	I	System Clock Input
51	$\overline{\text{HSYNC}}$	I/O	Horizontal Sync
52	ODD/EVEN	I/O	Vertical Sync
AC-3/MPEG1-2 AUDIO OUTPUT INTERFACE			
43	SCLK	O	Serial Bit Clock
44	PCM_OUT0	O	Audio Serial Output Data 0
24	PCM_OUT1	O	Audio Serial Output Data 1
21	PCM_OUT2	O	Audio Serial Output Data 2
45	PCM_CLK	I/O	PCM Clock In or Out
46	LRCLK	O	Left/Right Clock
47	SPDIF_OUT	O	SPDIF Output

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
EXTERNAL INTERRUPTS			
23, 25	IRQ[0:1]	I	External Interrupts
PROGRAMMABLE I/O AND ALTERNATE FUNCTION (see Device Configuration Chapter)			
15	PIO0 [0]	I/O	General Purpose I/O or PARA_SYNC (DVD//Front End) or Sc1Data (Smart Card 1 Data I/O)
16	PIO0 [3]	I/O	General Purpose I/O or PARA_REQ (DVD//Front End) or Sc1Clk (Smart Card 1 Clock)
17	PIO0 [4]	I/O	General Purpose I/O or PARA_STR (DVD//Front End) or Sc1RST (Smart Card 1 Reset)
20	PIO0 [5]	I/O	General Purpose I/O or PARA_DATA[0] (DVD//Front End) or Sc1Cmd V_{CC} (Smart Card 1 Voltage Enable)
21	PIO0 [6]	I/O	General Purpose IO or Sc1DataDir (Smart Card 1 Dir)
22	PIO0 [7]	I/O	General Purpose I/O or PARA_DATA[1] (DVD//Front End) or Sc1Detect(Smart Card 1 Detect)
9	PIO1 [0]	I/O	General Purpose I/O or I^{2}C Data
10	PIO1 [2]	I/O	General Purpose I/O or I^{2}C Clock
198, 199	PIO1 [3:4]	I/O	General Purpose IO
11	PIO1 [5]	I/O	General Purpose IO or ASC1 TXD
12	PIO1 [6]	I/O	General Purpose IO or ASC1 RXD
13	PIO1 [7]	I/O	General Purpose IO or ASC3 TXD
3	PIO2 [0]	I/O	General Purpose I/O or Sc0Data (Smart Card 0 Data I/O)
5	PIO2 [3]	I/O	General Purpose I/O or Sc0Clk (Smart Card 0 Clock)
6	PIO2 [4]	I/O	General Purpose I/O or Sc0RST (Smart Card 0 Reset)
7	PIO2 [5]	I/O	General Purpose I/O or Sc0CmdV_{CC} (Smart Card 0 Voltage Enable)
8	PIO2 [7]	I/O	General Purpose I/O or Sc0Detect (Smart Card 0 Detect)
201	PIO3 [0]	I/O	General Purpose IO or OSLink In
202	PIO3 [1]	I/O	General Purpose IO or OSLink Out
203	PIO3 [2]	I/O	General Purpose IO or CPUReset
204	PIO3 [3]	I/O	General Purpose IO or CPU Analyse
205	PIO3 [4]	I/O	General Purpose IO or ErrorOut
206, 207, 2	PIO3 [5:7]	I/O	General Purpose IO
191-197	PIO4 [0:6]	I/O	General Purpose IO
14	PIO4 [7]	I/O	General Purpose IO or ASC3 RXD
JTAG INTERFACE			
188	TCK	I	Test Clock
186	TDI	I	Test Data Input
189	TDO	O	Test Data Input
187	TMS	I	Test Mode Select
190	$\overline{\text{TRST}}$	I	Test Reset
SYSTEM USE			
28	PWM2	O	PWM2 Output
27	PWM1/BOOTFROMROM	O/I	PWM1 Output or Configuration Oslink Pins
26	PWM0/OSLINK_SEL	O/I	PWM0 Output or Boot from ROM during Reset
29	$\overline{\text{RST}}$	I	Reset
116	AUXCLK	O	Auxilary Clock for Any Purpose

II - PIN DESCRIPTION (continued)

II.2 - Pin List (continued)

Pin	Name	Type	Function
SDRAM INTERFACE			
78-81, 69, 70-74, 82, 83	AD[0:11]	O	SDRAM Address Bus
92-94, 97-101, 106-109, 112-115	DQ[0:15]	I/O	SDRAM Data (Lower Byte)
84, 85	$\overline{\text{SDCS}}$[0:1]	O	SDRAM Chip Selects
89	$\overline{\text{SDCAS}}$	O	SDRAM CAS
88	$\overline{\text{SDRAS}}$	O	SDRAM RAS
90	$\overline{\text{SDWE}}$	O	SDRAM Write Enable
104	MEMCLKIN	I	SDRAM Memory Clock Input
76	MEMCLKOUT	O	SDRAM Memory Clock Output
91	DQML	O	DQ Mask Enable (Lower)
105	DQMU	O	DQ Mask Enable (Upper)
EXTERNAL MEMORY INTERFACE			
161-170, 173-183	ADR[1:21]	I/O	External Memory Address Bus
141-148, 151-158	DATA[0:15]	I/O	External Memory Data Bus
128	$\overline{\text{RAS1}}$/HOLDREQ	O	DRAM RAS or reserved
136	WAIT/READY	I/O	External Wait States or Reserved
133	R/$\overline{\text{W}}$/DMAACK	I/O	DRAM R/$\overline{\text{W}}$ Strobe or Reserved
121, 122	$\overline{\text{BE}}$[0:1]	O	Byte enable
129	$\overline{\text{CAS0}}$/HOLDACK	O/I	DRAM CAS or Reserved
132	$\overline{\text{CAS1}}$/DMAREQ	O	DRAM CAS or Reserved
124-126	$\overline{\text{CE}}$[1:3]	O	Chip Select for Banks 1 - 3
135	$\overline{\text{CS}}$	I	Reserved
137	PROCCLK	I/O	ST20 Clock or Reserved
127	$\overline{\text{RAS0}}$/$\overline{\text{CE0}}$	O	DRAM RAS or Chip Select for Bank 0
134	DMAXFER	I	Reserved
138	$\overline{\text{PPC\_MODE}}$	I	Reserved
123	$\overline{\text{OE}}$	I/O	Output Enable or Reserved
SDAV/P1394 INTERFACE			
30	TEST1	I/O	DATA_RX/STROBE_TX (SDAV Mode) or SDAV_CLK (P1394 Mode)
31	TEST2	I/O	STROBE_RX/DATA_TX (SDAV Mode) or DATA_IN/DATA_OUT (P1394 Mode)
32	TEST3	I/O	Direction (SDAV Mode) or DATA_VALID In/Out (P1394 Mode)
MISCELLANEOUS			
41	TEST5	O	NRSS_OUT (DVB/DSS)

III - FUNCTIONAL DESCRIPTION

III.1 - Functional Modules

Figure 1 shows the subsystem modules that make up the STi5505. These modules are outlined below.

III.1 - CPU

The Central Processing Unit (CPU) on the STi5505 is the ST20-C2 32-bit processor core. It contains instruction processing logic, instruction and data pointers and an operand register. It directly accesses the high speed on-chip SRAM memory, which can store data or programs, and uses the Caches to reduce access time to off chip program and data memory.

The processor can access memory via the general purpose External Memory Interface (EMI) or via the SDRAM EMI which is shared with the MPEG decoder.

III.2 - Memory Subsystem

The STi5505 on-chip SRAM memory system provides 160 Mbytes/s internal data bandwidth, supporting pipelined 2 cycles internal memory access at 25ns cycle times. The STi5505 memory system consists of 2 Kbytes of SRAM, 2Kbytes of instruction cache, a 2Kbytes data cache that can be programmed to be SRAM, and an external memory interface (EMI).

The STi5505 product has 2 Kbytes of on-chip SRAM. The advantage of this is the ability to store time critical code on chip, for instance interrupt routines, software kernels or device drivers, and even frequently used data without these being flushed from the caches.

The instruction and data caches are direct mapped with a write-back system for the data cache and support burst accesses to the external memories for refill and write-back which are effective for increasing performance with page-mode and SDRAM memories.

The STi5505 EMI controls access to the external memory and peripherals while the SDRAM EMI provides access to the SDRAM buffer for the MPEG decoders, ST20 and DMA peripherals.

The STi5505 EMI can access a 16 Mbytes (or greater if DRAM is used) physical address space in each of the four general purpose memory banks, and provides sustained transfer rates of up to 80 Mbytes/s. Peripherals that support an asynchronous data acknowledge are supported as is an external Power PC which can share the bus with the STi5505 and access the SDRAM buffer through the device.

High memory bandwidths up to 200 Mbytes/s can be supported by the SDRAM EMI.

The STi5505 internal memory interconnect provides buffering and arbitration of memory access requests to sustain very high throughput of memory accesses.

III.3 - System Services Module

The STi5505 system services module includes :

- Phase locked loop (PLL) - accepts 27MHz input and generates all the internal high frequency clocks needed for the CPU and the OS-Link.
- test access port - JTAG compatible.
- Diagnostics controller accessed via the JTAG port providing :
- Bootstrapping during development
- Hardware breakpoint and watchpoint
- Real time trace
- External LSA triggering support.

III.4 - Serial Communications

To facilitate the connection of this system the front end device and other peripherals, two UARTs (ASCs) are included in the device. The UARTs provide an asynchronous serial interface.

The UART can be programmed to support a range of baud rates and data formats, for example, data size, stop bits and parity. Two synchronous serial communications (SSC) interfaces are provided on the device. These can be used for a remote control device for example via an I^2C or SPI bus.

III.5 - Interrupt Subsystem

The STi5505 interrupt subsystem supports eight prioritized interrupt levels. Two external interrupt pins are provided. Level assignment logic allows any of the internal or external interrupts to be assigned and, if necessary, share any interrupt level.

III.6 - Front End Interface & DVD Decryption

The front end interface accepts sectors in the case of DVD, MPEG-1 system stream in the case of VCD and PCM data for CD-DA applications on an I2S interface. In the case of VCD and CD-DA disks the subcode information is input via a simple asynchronous serial interface similar to a UART.

The bitstream and subcode stream then pass through a "sector processor" block which handles sector filtering in the case of DVD and sectorizing using the subcode stream for VCD and CD-DA systems.

III - FUNCTIONAL DESCRIPTION (continued)

The block also handles overspeed processing for all systems. The capturing of CD-DA sectors is based on a flywheel tiner to improve robusters by concealing erros in the subcode stream. For DVD the data, having had sector headers removed, then passes through a DVD conformant de-cryption stage and is written into any of the system memories using a programmable DMA engine. When a subcode stream is present it is locally buffered, by subcode block and can be read by the CPU for subsequent processing, if required.

III.7 - PWM and counter module

This unit includes three separate pulse width modulator (PWM) generators using a shared counter, and three timer compare and capture channels sharing a second counter.

The counters can be clocked from a pre-scaled internal clock or from a pre-scaled external clock via the capture clock input and the event on which the timer value is captured is also programmable.

The PWM counters are 8-bit with 8-bit registers to set the output high time. The capture/compare counter and the compare and capture registers are 32-bit.

III.8 - Parallel Programmable IO module

40 bits of parallel I/O are provided. 34 of then are connected to actual PIO pins. Each bit is programmable as an output or an input. The output can be configured as a totem pole or open drain driver. Input compare logic is provided which can generate an interrupt on any change on any input bit.

Many pins of the STi5505 device are multi-function and can either be configured as PIO or connected to an internal peripheral signal.

III.9 - MPEG Video decoder

The video decoder is a real-time video compression processor supporting the MPEG-1 and MPEG-2 standards at video rates up to 720 x 480 x 60 Hz and 720 x 576 x 50 Hz. Picture format conversion for display is performed by vertical and horizontal filters. User-defined bitmaps may be superimposed on the display picture through use of the on-screen display function.

III.10 - PAL/NTSC encoder

The digital encoder which is integrated in the STi5505 converts a multiplexed 4:2:2 YUV stream into a standard analog baseband PAL/NTSC signal and into RGB analog components. The encoder can also perform closed-caption, CGMS or teletext encoding and allows Macrovision™ 7.01/6.1 copy protection.

III.11 - MPEG-2 Audio / Dolby AC-3 Decoder

The audio decoder is a Dolby AC-3 decoder capable of decoding both 5.1 and 2 channel DVD comformant bitstreams. The decoder also handles MPEG-1 (layers 1 & 2) and MPEG-2 layer 2 (6 channels). Downmix to 2 channels is possible for Dolby and MPEG standards with optional pro-logic encoding.

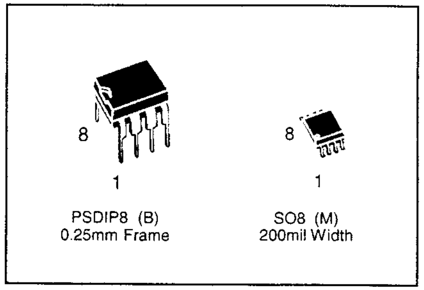
The decoder directly accepts MPEG-2 PES streams as input. The decoder is capable of supporting IEC6958-IEC61937 formatted outputs for AC-3 and MPEG audio, linear PCM (left & right,16, 18, 20 & 24 bits), zero output (Mute mode) and PCM audio.

ST24E32
ST25E32

32K SERIAL I²C EEPROM with EXTENDED ADDRESSING

NOT FOR NEW DESIGN

- COMPATIBLE with I²C EXTENDED ADDRESSING
- TWO WIRE SERIAL INTERFACE, SUPPORTS 400kHz PROTOCOL
- 1 MILLION ERASE/WRITE CYCLES, OVER the FULL SUPPLY VOLTAGE RANGE
- 40 YEARS DATA RETENTION
- SINGLE SUPPLY VOLTAGE
  - ± 4.5V to 5.5V for ST24E32 version
  - ± 2.5V to 5.5V for ST25E32 version
- WRITE CONTROL FEATURE
- BYTE and PAGE WRITE (up to 32 BYTES)
- BYTE, RANDOM and SEQUENTIAL READ MODES
- SELF TIMED PROGRAMING CYCLE
- AUTOMATIC ADDRESS INCREMENTING
- ENHANCED ESD/LATCH UP PERFORMANCES
- ***ST24E32 and ST25E32 are replaced by the M24C32***



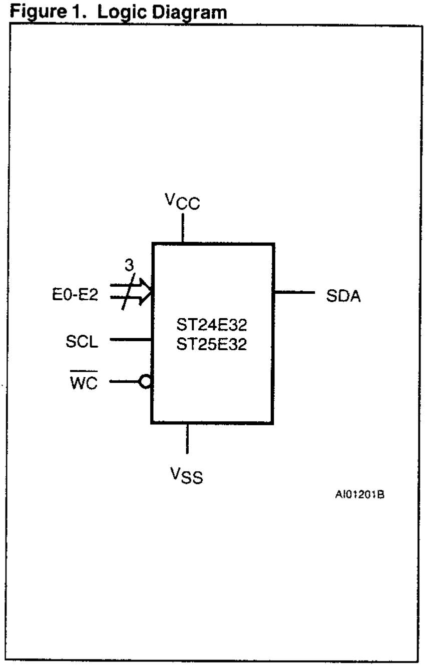
DESCRIPTION

The ST24/25E32 are 32K bit electrically erasable programmable memories (EEPROM), organized as 8 blocks of 512 x 8 bits. The ST25E32 operates with a power supply value as low as 2.5V. Both Plastic Dual-in-Line and Plastic Small Outline packages are available.

Table 1. Signal Names

E0 - E2	Chip Enable Inputs
SDA	Serial Data Address Input/Output
SCL	Serial Clock
$\overline{\text{WC}}$	Write Control
V_{CC}	Supply Voltage
V_{SS}	Ground

Figure 1. Logic Diagram



ST24E32, ST25E32

Figure 2A. DIP Pin Connections

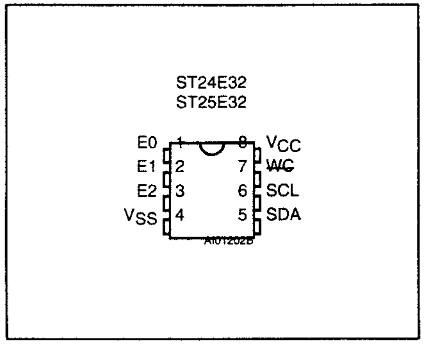

ST24E32
ST25E32
E0
E1
E2
VSS
VCC
WC
SCL
SDA
1
2
3
4
8
7
6
5
AI01202B

Figure 2B. SO Pin Connections

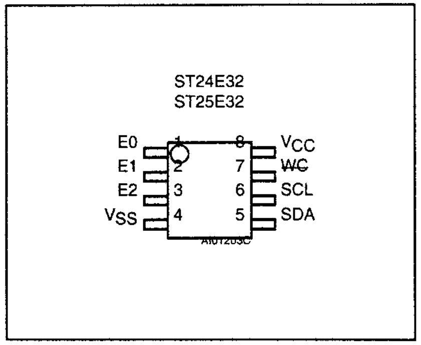

ST24E32
ST25E32
E0
E1
E2
VSS
VCC
WC
SCL
SDA
1
2
3
4
8
7
6
5
AI01203C

Table 2. Absolute Maximum Ratings (1)

Symbol	Parameter	Value	Unit
T_A	Ambient Operating Temperature	±40 to 125	°C
T_{STG}	Storage Temperature	±65 to 150	°C
T_{LEAD}	Lead Temperature, Soldering (SO8) 40 sec (PSDIP8) 10 sec	215 260	°C
V_{IO}	Input or Output Voltages	±0.6 to 6.5	V
V_{CC}	Supply Voltage	±0.3 to 6.5	V
V_{ESD}	Electrostatic Discharge Voltage (Human Body model) (2)	4000	V
	Electrostatic Discharge Voltage (Machine model) (3)	500	V

Notes: 1. Except for the rating °Operating Temperature Range°, stresses above those listed in the Table °Absolute Maximum Ratings° may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the Operating sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability. Refer also to the SGS-THOMSON SURE Program and other relevant quality documents.
2. 100pF through 1500Ω; MIL-STD-883C, 3015.7
3. 200pF through 0Ω; EIAJ IC-121 (condition C)

DESCRIPTION (cont'd)

Each memory is compatible with the I²C extended addressing standard, two wire serial interface which uses a bi-directional data bus and serial clock. The ST24/25E32 carry a built-in 4 bit, unique *device identification code (1010) corresponding to* the I²C bus definition. The ST24/25E32 behave as slave devices in the I²C protocol with all memory operations synchronized by the serial clock. Read and write operations are initiated by a START condition generated by the bus master. The START condition is followed by a stream of 4 bits (identification code 1010), 3 bit Chip Enable input to form *a 7 bit Device Select, plus one read/write bit and* terminated by an acknowledge bit.

9.24 Description of Furore IC

9.24.1 General Description

FURORE-IC is a one-chip design containing all the hardware required for SACD processing. It is intended to interface to the Sti family (Sti5505/Sti5508) DVD video decoders.
The FURORE-IC contains a memory interface to support one 4M*16 SDRAM or one 1M*16 SDRAM device.

9.24.2 Blockdiagram

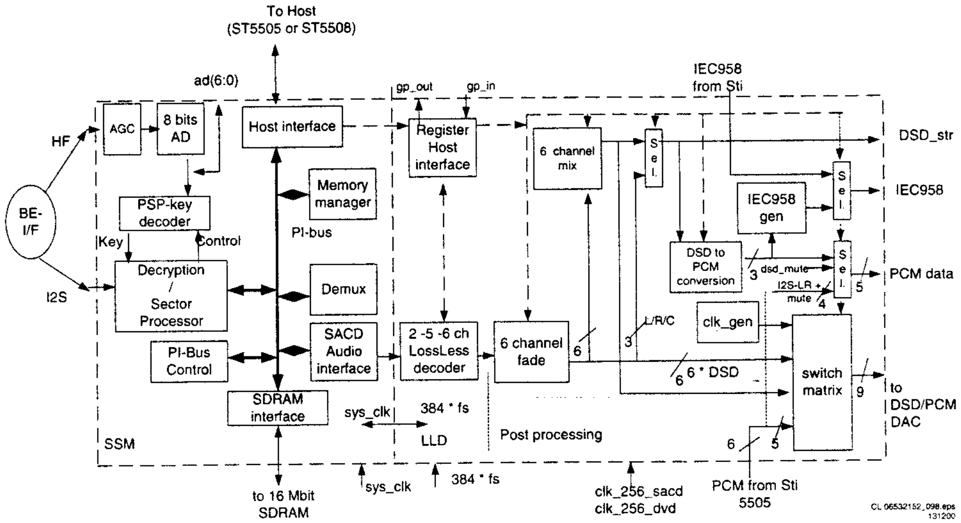

To Host
(ST5505 or ST5508)
ad(6:0)
gp_out
gp_in
IEC958
from Sti
HF
AGC
8 bits
AD
Host interface
Register
Host
interface
6 channel
mix
S
e
l.
DSD_str
IEC958
IEC958
gen
BE-
I/F
PSP-key
decoder
Memory
manager
PI-bus
Key
Control
DSD to
PCM
conversion
3
dsd_mute
I2S-LR +
mute
4
5
PCM data
I2S
Decryption
/
Sector
Processor
Demux
L/R/C
3
clk_gen
PI-Bus
Control
SACD
Audio
interface
2 -5 -6 ch
LossLess
decoder
6 channel
fade
6
6 * DSD
6
switch
matrix
9
to
DSD/PCM
DAC
SDRAM
interface
sys_clk
384 * fs
LLD
Post processing
6
5
SSM
to 16 Mbit
SDRAM
sys_clk
384 * fs
clk_256_sacd
clk_256_dvd
PCM from Sti
5505
CL 06532152_098.eps
131200

Figure 9-7

9.24.3 Basic Engine Interface

Data input interface.
The Basic Engine Interface is connected to the output of the SAA7335 (HD61)

Analogue HF input
The analogue HF input. coming from the optical pickup unit, is also fed to the Furore IC to extract the copyprotection information "PSP".

9.24.4 SDRAM Interface

The SDRAM interface forms a glueless interface to one 16Mbit or one 64 Mbit SDRAM device.
The interface takes care for the power-up sequence, mode programming and refreshing of the SDRAM devices. This is hard coded in the interface and doesn't have to be controlled by the host.

9.24.5 Audio data input/output Interface

DSD/PCM combined data output.
DSD_PCM : Output intended for a combined 6 channel DSD (SACD) and PCM (DVD-CDDA) DAC. Switching between the PCM data coming from the Sti5505 and the internal generated DSD signals is done in the Furore IC.

Stereo DSD only output.
DSD_stereo: 2 channel DSD output, with stereo down mix in the case of 5 and 6 channel and normal stereo in case of 2 channel DSD mode.

Stereo PCM data output.
Two possible stereo sources can be selected as stereo PCM output:
- Stereo PCM coming from the Sti5505 via the PCM input on Furore.
- Stereo or down mix PCM derived via a decimation filter from the SACD-DSD signal.

Digital audio output interface (IEC958)
The IEC958 format is intended to connect the SACD 1000 to a digital receiver. No DSD signals are defined for IEC958 therefore the DSD-->PCM converted signal will be transmitted. Following two types of signals are possible on the digital interface:
- IEC958 data coming from Sti5505.
- IEC958 data, Stereo or down mix PCM, derived via a decimation filter from the SACD-DSD signal.

Clock + reset input.
Two different processing clocks are needed in the FURORE-IC:
- Sys_clk: System clock for data processing part, frequency can be 27 MHz or 768 * Fs.

RESETn is an asynchronous reset and should be low for at least 1 period of DSD_CLK.

General-purpose in/outputs.

Four general purpose input and output signals are available.

9.24.6 Pin description

IC-Pin_no	Name	Type	Function
1	H_DQ[13]	I/O5	Data bus
2	H_DQ[12]	I/O5	Data bus
3	VCC_IO	IN	3.3V power supply IO
4	GND_IO	IN	Ground
5	H_DQ[11]	I/O5	Data bus
6	H_DQ[10]	I/O5	Data bus
7	H_DQ[9]	I/O5	Data bus
8	H_DQ[8]	I/O5	Data bus
9	H_DQ[7]	I/O5	Data bus
10	H_DQ[6]	I/O5	Data bus
11	H_DQ[5]	I/O5	Data bus
12	H_DQ[4]	I/O5	Data bus
13	VCC_CORE	IN	3.3V power supply Core
14	GND_CORE	IN	Ground(core)
15	H_DQ[3]	I/O5	Data bus
16	H_DQ[2]	I/O5	Data bus
17	H_DQ[1]	I/O5	Data bus
18	H_DQ[0]	I/O5	Data bus
19	VCC_IO	IN	3.3V power supply IO
20	H_procclock	IN	Host processor EMI interface clock
21	GND_IO	IN	Ground
22	H_WAIT	O5	Wait signal
23	H_RWn	IN	READ=1,Write=0
24	H_CSLn	IN	Chip Select, active low
25	H_CSHn	IN	Chip select
26	H_ben(1)	IN	Byte Enable 1
27	H_ben(0)	IN	Byte Enable 0
28	B_V4	IN	Versatile Input Pin (contains Subcode), not used
29	B_SYNC	IN	Sector sync / Absolute time sync
30	B_FLAG	IN	I2S flag (EDC flag)
31	B_BCLK	IN	I2S Bit ClocK
32	B_WCLK	IN	I2S Word CLock
33	B_DATA	IN	I2S Data
34	GP_in_pin(0)	IN	General purpose in
35	GP_in_pin(1)	IN	General purpose in
36	AD[6]	I/O5	
37	AD[5]	I/O5	
38	AD[4]	I/O5	
39	VCC_CORE	IN	3.3V power supply Core
40	GND_CORE	IN	Ground(core)
41	AD[3]	I/O5	
42	AD[2]	I/O5	
43	AD[1]	I/O5	
44	AD[0]	I/O5	Digital out of AD OR digital in for PLL
45	GP_in_pin (2)	IN	General purpose in
46	biasin	APIO	Current input. connect via 15K to VSS
47	vddaagc	VDDCO	VDD of AGC (+ 3.3V)
48	Agcadctstp	APIO	AGC Positive channel test pin
49	vssaagc	VSSCO	Analog ground for AGC.
50	agcinp	APIO	AGC positive input signal, HF in.
51	VCC_IO	IN	3.3V power supply IO
52	GND_IO	In	Ground
53	agcadctstn	APIO	AGC Negative channel test pin
54	vssaadc	VSSCO	VSS of AGC & ADC connected to substrate
55	vddaadc	VDDCO	VDD of ADC (+3.3V)
56	adcrefh	APIO	ADC decoupling high . (via 100nF to VSS)
57	Adcrefm	APIO	ADC decoupling middle . (via 100nF to VSS)
58	adcrefl	APIO	ADC decoupling low. (via 100nF to VSS)
59	vssrefadc	VSSCO	VSS of Reference Ladder of ADC (not to the substrate)
60	PCM_LeRi_in	IN	PCM data Left/Right
61	PCM_CeLf_in	IN	PCM data Centre/LFE
62	PCM_LsRs_in	IN	PCM data lift/Right surround
63	PCM_wclk_in	IN	PCM word clock
64	PCM_dclk_in	IN	PCM data clock
65	VCC_CORE	IN	3.3V power supply Core
66	GND_CORE	IN	Ground(core)
67	GP_in_pin (3)	IN	General purpose in
68	D_ADDR[4]	O5	SDRAM Address bus
69	D_ADDR[5]	O5	SDRAM Address bus
70	GND_IO	IN	Ground
71	D_ADDR[6]	O5	SDRAM Address bus
72	D_ADDR[7]	O5	SDRAM Address bus
73	D_ADDR[8]	O5	SDRAM Address bus
74	D_ADDR[9]	O5	SDRAM Address bus
75	VCC_IO	IN	3.3V power supply IO
76	D_clk	O5	Clock signal needed for SDRAM.
77	GND_IO	IN	Ground
78	D_ADDR[0]	O5	SDRAM Address bus
79	D_ADDR[1]	O5	SDRAM Address bus
80	D_ADDR[2]	O5	SDRAM Address bus
81	D_ADDR[3]	O5	SDRAM Address bus
82	VCC_IO	IN	3.3V power supply IO
83	GND_IO	IN	Ground
84	D_ADDR[10]	O5	SDRAM Address bus
85	D_ADDR[11]	O5	SDRAM Address bus
86	GND_IO	-	Ground.
87	D_RASn	O5	Row Address Select
88	D_CASn	O5	Column Address Select
89	D_Wen	O5	Read/Write
90	D_LDQM	O5	DQ mask enable (lower)
91	VCC_CORE	IN	3.3V power supply Core
92	GND_CORE	IN	Ground(core)
93	D_UDQM	O5	DQ mask enable (Upper)
94	D_DQ[0]	I/O5	Data bus
95	VCC_IO	IN	3.3V power supply IO
96	D_DQ[1]	I/O5	Data bus
97	D_DQ[2]	I/O5	Data bus
98	D_DQ[3]	I/O5	Data bus
99	D_DQ[4]	I/O5	Data bus
100	VCC_IO	IN	3.3V power supply IO
101	GND_IO	IN	Ground
102	D_DQ[5]	I/O5	Data bus
103	D_DQ[6]	I/O5	Data bus
104	D_DQ[7]	I/O5	Data bus
105	D_DQ[8]	I/O5	Data bus
106	D_DQ[9]	I/O5	Data bus
107	D_DQ[10]	I/O5	Data bus
108	D_DQ[11]	I/O5	Data bus
109	D_DQ[12]	I/O5	Data bus
110	VCC_IO	IN	3.3V power supply IO
111	GND_IO	IN	Ground
112	D_DQ[13]	I/O5	Data bus
113	D_DQ[14]	I/O5	Data bus
114	D_DQ[15]	I/O5	Data bus
115	D_ADDR[12]	O5	SDRAM Address bus
116	D_ADDR[13]	O5	SDRAM Address bus
117	VCC_CORE	IN	3.3V power supply Core
118	GND_CORE	IN	Ground(core)

IC-Pin_no	Name	Type	Function
119	DSD_PCM_0	O10	DSD data output signal. On 64 * Fs Stereo : Left channel (channel 0) MCA5/6 : front left (channel 0) OR From PCM switch matrix
120	DSD_PCM_1	O10	Stereo : right channel (channel 1) MCA 5/6 : front right (channel 1) OR From PCM switch matrix
121	DSD_PCM_2	O10	Stereo : mute sequence MCA 5/6 : front centre (channel 2) OR From PCM switch matrix
122	DSD_PCM_3	O10	stereo : mute sequence MCA-5 : mute sequence MCA-6 : LFE channel. (channel 3) OR From PCM switch matrix
123	VCC_IO	IN	3.3V power supply IO
124	GND_IO	IN	Ground
125	DSD_PCM_4	O10	Stereo : mute sequence MCA-5 : left surround (channel 3) MCA-6 : left surround (channel 4) OR From PCM switch matrix
126	DSD_PCM_5	O10	Stereo : mute sequence MCA-5 : right surround (channel 4) MCA-6 : right surround (channel 5) OR From PCM switch matrix
127	DSD_PCM_6	O5	DSD clock signal. OR From PCM switch matrix
128	DSD_PCM_7	O5	DSD stereo or down mix Left OR From PCM switch matrix
129	DSD_PCM_8	O5	DSD stereo or down mix Right OR From PCM switch matrix
130	DSD_str(0)	O10	DSD stereo or downmix on DSD.
131	DSD_str(1)	O10	DSD stereo or downmix on DSD.
132	dsd_clk	O5	DSD clock for DSD stereo signal.
133	VCC_IO	IN	3.3V power supply IO
134	GND_IO	IN	Ground
135	PCM_LeRi_Out	O10	PCM data Left/Right to AV PCB
136	PCM_wclk_Out	O5	PCM word clock
137	fs_256_sacd	IN	256 * Fs audio clock generated for SACD (Fs=44.1Khz)
138	mute_tot	O10	Selectable mute signal from PCM source or internal SACD source.
139	fs_256_dvd	IN	256 * Fs audio clock generated for DVD (Fs=48 kHz)
140	RESETn	IN	Asynchronous Reset
141	D_cke	O5	Clock enable output to SDRAM to enable the power down mode.
142	PCM_clk_Out	O5	256 * fs O10put./384 * Fs O10
143	VCC_CORE	IN	3.3V power supply Core
144	GND_CORE	IN	Ground(core)
145	PCM_mute_in	IN	PCM mute signal.
146	IEC958_in	IN	IEC958 input from Sti5505
147	IEC958_Out	O10	IEC958 O10put
148	VCC_IO	IN	3.3V power supply IO
149	CLK	IN	system Clock 27 Mhz
150	GND_IO	IN	Ground
151	GP_out_pin (0)	O10	General purpose out
152	GP_out_pin (1)	O10	General purpose out
153	GP_out_pin (2)	O10	General purpose out
154	GP_out_pin (3)	O10	General purpose out
155	Prog_clk_sys	O10	Clock divide from system clock.
156	Prog_clk_384	O10	Clock divided from 384 * Fs LLD clock.
157	Pll_lock	O10	Indication that PLL is in lock
158	VCC_IO	IN	3.3V power supply IO
159	clk_384	IN	DSD system clock 384*Fs = 16.934400Hz
160	GND_IO	IN	Ground
161	Pll_sync	O10	Sector sync found
162	Psp_enable	O10	If '1' PSP circuit is active
163	75hz_pulse	O10	75 Hz pulse to audio interface
164	Ssm_act	O10	Indication new frame is being transmitted
165	Lld_mute	O10	If '1' mute indication from audio interface
166	Play	O10	If '1' Fade circuit is in LLD mode
167	mute_det	O10	Mute 0x69 for all channels detection
168	Fade_busy	O10	Indication that fade in/out is busy
169	Do_grab	O10	Active data out of LLD.
170	VCC_CORE	IN	3.3V power supply Core

IC-Pin_no	Name	Type	Function
171	GND_CORE	IN	Ground(core)
172	PCM_dclk_Out	O5	PCM data clock
173	Tst(1)	IN	internal pull up for both test pins
174	Tst(0)	IN	IC testpins tst(1:0) 11 : Functional behaviour 10 : RAM test 01 : scan shift 00 : scan normal
175	TDI	IN	Boundary scan Data Input.
176	TMS	IN	Boundary scan Mode select
177	TCK	IN	Boundary scan Clock
178	TDO	O10	O10put
179	TRST	IN	Boundary scan Reset.
180	GND_IO	IN	Ground
181	H_IRQn	O5	Interrupt Request, active low
182	H_A22	IN	Data Strobe, active low
183	H_A[21]	IN	Address bus
184	H_A[20]	IN	Address bus
185	H_A[19]	IN	Address bus
186	H_A[18]	IN	Address bus
187	H_A[17]	IN	Address bus
188	H_A[16]	IN	Address bus
189	H_A[15]	IN	Address bus
190	H_A[14]	IN	Address bus
191	H_A[13]	IN	Address bus
192	H_A[12]	IN	Address bus
193	H_A[11]	IN	Address bus
194	H_A[10]	IN	Address bus
195	VCC_CORE	IN	3.3V power supply Core
196	GND_CORE	IN	Ground(core)
197	H_A[9]	IN	Address bus
198	H_A[8]	IN	Address bus
199	H_A[7]	IN	Address bus
200	H_A[6]	IN	Address bus
201	H_A[5]	IN	Address bus
202	H_A[4]	IN	Address bus
203	H_A[3]	IN	Address bus
204	H_A[2]	IN	Address bus
205	H_A[1]	IN	Address bus
206	VCC_IO	IN	3.3V power supply IO
207	H_DQ[15]	I/O5	Data bus
208	H_DQ[14]	I/O5	Data bus

9.25 Circuit description of DAC board

9.25.1 Description

The DAC board has 6 high performance audio outputs. It consists of 3 D/A converters and their appropriate filters, the clock generator part. the filter-control part and the muting-control part (See block diagram).
Key components are D/A converter CS4397 and I2C controller PCF8574.
The DAC board supports DSD and PCM. The digital data are sent from the MONO board to the DAC's QD41,QD51 and QD61 via a flex and connector JD01. The audio signals are sent to the cinches via a 2 or 1 filter stage. In these filter stages discrete opamp's are used.
The DAC board is I2C controlled via the I2C bus from the mono board to the DAC's and I2C controller QD21.
The differences between DSD mode and PCM mode are shown in the table below:
Digital audio data

Pin number	PCM mode	DSD mode
11	BCK	BCK
12	LRCK	SEL_DSD
13	SDT	DSD_L
14	SEL_PCM	DSD_R

MCLK

AUDIO SIGNAL	MCLK
DSD(SACD)	192Fs(8.4672 MHz)
PCM audio (Fs = 44.1 kHz) (CD)	384Fs(16.9344 MHz)
PCM audio (Fs = 32,4896 kHz)	256Fs

9.25.2 Filter setting

The user can select 3 filter settings using switch SD71 at the rear of the set. This is only effective during the playback of SACD discs. See the table below.

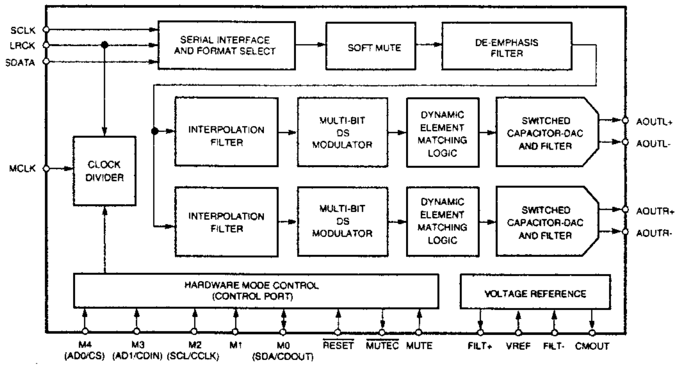
DISCS	Filter switch position		
	Position 1	position 2	position 3
SACD (DSD)	All channels: Normal*	L and R: Custom* Other channels: Normal	All channels: Custom
CD (PCM)	All channels : Custom		

* Normal: output via 1 filter stage (3rd order filter)
- Custom: output via 2 filter stage (6th order filter)

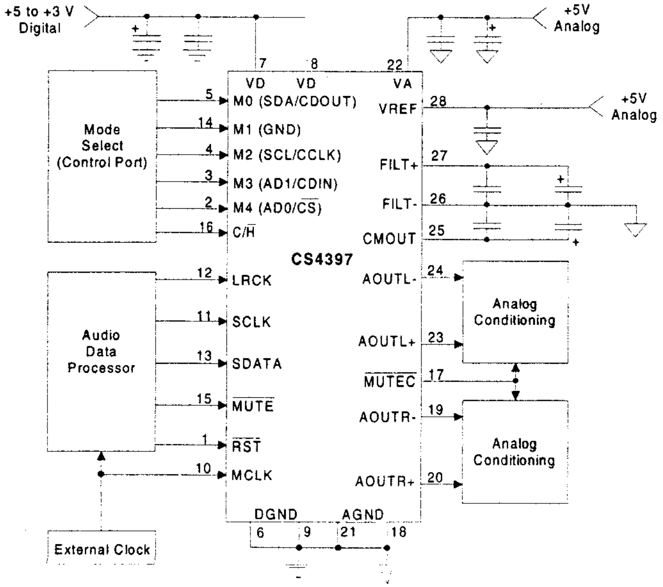
9.25.3 Description of DAC CS4397

CS4397

Block Diagram


SCLK
LRCK
SDATA
SERIAL INTERFACE AND FORMAT SELECT
SOFT MUTE
DE-EMPHASIS FILTER
MCLK
CLOCK DIVIDER
INTERPOLATION FILTER
MULTI-BIT DS MODULATOR
DYNAMIC ELEMENT MATCHING LOGIC
SWITCHED CAPACITOR-DAC AND FILTER
AOUTL+
AOUTL-
AOUTR+
AOUTR-
HARDWARE MODE CONTROL (CONTROL PORT)
VOLTAGE REFERENCE
M4 (AD0/CS)
M3 (AD1/CDIN)
M2 (SCL/CCLK)
M1
M0 (SDA/CDOUT)
RESET
MUTEC
MUTE
FILT+
VREF
FILT-
CMOUT

Pin Configuration


+5 to +3 V Digital
+5V Analog
+5V Analog
VD
VD
VA
Mode Select (Control Port)
M0 (SDA/CDOUT)
M1 (GND)
M2 (SCL/CCLK)
M3 (AD1/CDIN)
M4 (AD0/CS)
C/H
VREF
FILT+
FILT-
CMOUT
CS4397
Audio Data Processor
LRCK
SCLK
SDATA
MUTE
RST
MCLK
AOUTL-
AOUTL+
MUTEC
AOUTR-
AOUTR+
Analog Conditioning
Analog Conditioning
DGND
AGND
External Clock
7 8 22 5 14 4 3 2 16 28 27 26 25 12 11 13 15 1 10 24 23 17 19 20 6 9 21 18

Typical Connection Diagram - Hardware Mode (Control Port Mode)

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Pin Function

No.	Pin Name	I/O	Description
1	RST	I	Reset input (Low active)
2	M4(AD0/CS)	I	Chip address bit0 for I2C
3	M3(AD1/CDIN)	I	Chip address bit1 for I2C
4	M2(SCL/CCLK))	I	Serial clock for I2C
5	M0(SDA/CDOUT)	I/O	Serial data for I2C
6	DGND		Digital ground
7	VD		Digital power supply +3.3V
8	VD		Digital power supply +3.3V
9	DGND		Digital ground
10	MCLK	I	Master clock PCM mode:256Fs DSD mode:192Fs (8.4672MHz)
11	SCLK	I	Serial data clock
12	LRCK(PCM) CLKMODE(DSD)	I I	PCM mode:Left/Right channel clock DSD mode:Select MCLK to DSD data rate clock rations
13	SDATA(PCM) DSD_L(DSD)	I	PCM mode:Serial audio data DSD mode:Direct Stream Digital audio data (Left)
14	M1(PCM) DSD_R(DSD)	I	PCM mode:(Low) DSD mode:Direct Stream Digital audio data (Right)
15	MUTE	I	Mute input (Low active)
16	C/H	I	Control port (H) /Hardware (L) mode select
17	MUTEC	O	Mute control (Low active)
18	AGND		Analog ground
19	AOUTR-	O	Right channel negative Analog out
20	AOUTR+	O	Right channel positive Analog out
21	AND		Analog ground
22	VA		Analog power supply +5.5V
23	AOUTL+	O	Left channel positive Analog out
24	AOUTL-	O	Left channel negative Analog out
25	CMOUT	O	Common mode voltage
26	FILT-	I	Reference ground
27	FILT+	O	Reference filter
28	VREF		Voltage reference input

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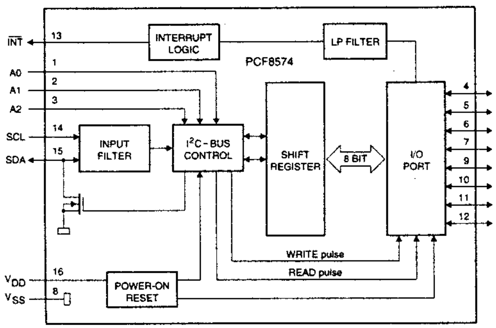
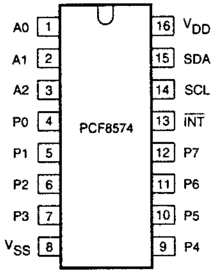
9.25.4 Description of I2C controller PC8574

PC8574

Block Diagram


INT
A0
A1
A2
SCL
SDA
VDD
VSS
13
1
2
3
14
15
16
8
INTERRUPT LOGIC
LP FILTER
PCF8574
INPUT FILTER
I²C - BUS CONTROL
SHIFT REGISTER
8 BIT
I/O PORT
POWER-ON RESET
WRITE pulse
READ pulse
4
5
6
7
9
10
11
12
P0
P1
P2
P3
P4
P5
P6
P7

Pin Configuration


A0 1
A1 2
A2 3
P0 4
P1 5
P2 6
P3 7
VSS 8
PCF8574
16 VDD
15 SDA
14 SCL
13 INT
12 P7
11 P6
10 P5
9 P4

Pin Function

SYMBOL	PIN		DESCRIPTION
	DIP16; SO16	SSOP20	
A0	1	6	address input 0
A1	2	7	address input 1
A2	3	9	address input 2
P0	4	10	quasi-bidirectional I/O 0
P1	5	11	quasi-bidirectional I/O 1
P2	6	12	quasi-bidirectional I/O 2
P3	7	14	quasi-bidirectional I/O 3
V_{SS}	8	15	supply ground
P4	9	16	quasi-bidirectional I/O 4
P5	10	17	quasi-bidirectional I/O 5
P6	11	19	quasi-bidirectional I/O 6
P7	12	20	quasi-bidirectional I/O 7
$\overline{INT}$	13	1	interrupt output (active LOW)
SCL	14	2	serial clock line
SDA	15	4	serial data line
V_{DD}	16	5	supply voltage
n.c.	-	3	not connected
n.c.	-	8	not connected
n.c.	-	13	not connected
n.c.	-	18	not connected

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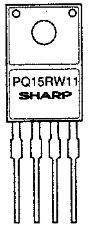
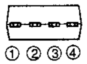
9.26 IC description of Linear power supply

PQ15RW11

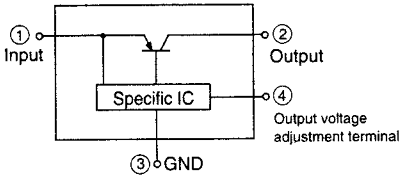

PQ15RW11
SHARP

Pin Configuration

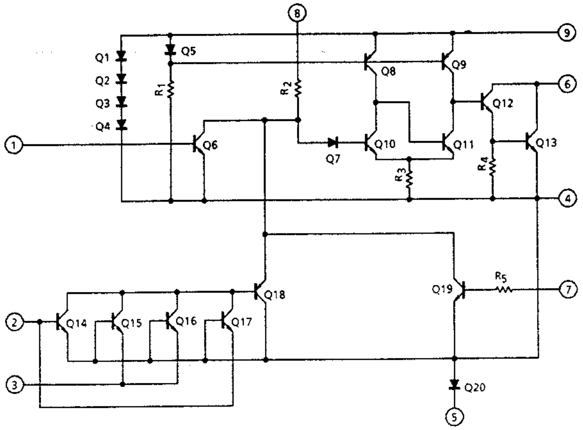


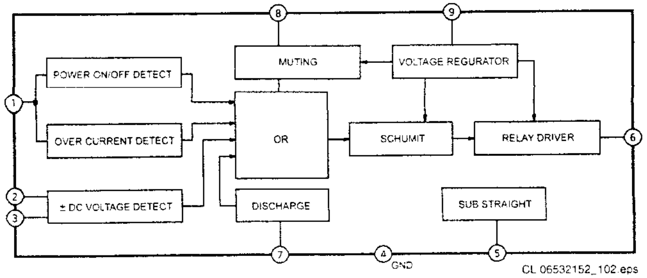
① DC input(Vin)
② DC output(Vo)
③ GND
④ Output voltage adjustment terminal(Vadj)

Block Diagram


① Input
② Output
Specific IC
④ Output voltage adjustment terminal
③ GND

TA7317P


8
9
6
1
4
7
2
3
5
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20
R1
R2
R3
R4
R5


8
9
1
2
3
6
7
4
GND
5
POWER ON/OFF DETECT
OVER CURRENT DETECT
± DC VOLTAGE DETECT
MUTING
VOLTAGE REGURATOR
OR
SCHUMIT
RELAY DRIVER
DISCHARGE
SUB STRAIGHT

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131200

9.27 List of abbreviations

+12VSTBY	+12V power supply present during standby
+3A	Filtered 3V3 power supply to IC7207(MACE servo processor)
+3V3	3V3 power supply
+3V3S	Stabilised 3V3 power supply from IC7605 to MACE (IC7207) circuit
+5V	+5V power supply
+5VA	Filtered +5V: analog power supply for IC7311(HD61 decoder)
+5VB	Filtered +5V: digital power supply for IC7311(HD61 decoder)
+5VC	+5V power supply for IC7202(servo flash eprom)
+5VSTBY	+5V power supply present during standby
+5VX	+5V power supply for IC7105(opamp)
+6VSTBY	+6V power supply present during standby
+9V	Stabilised +9V power supply from IC7109 to IC7103 (Servo power driver)
0_6_12V	Scart switch control signal to A/V board. 0V : loop through (AUX to TV), 6V : play 16:9 format, 12V : play 4:3 format
1.5V	1.5V reference voltage for IC7102 (DVDALAS)
2.0V	2V reference voltage for IC7102 (DVDALAS)
2.5V	2.5V reference voltage for IC7102 (DVDALAS)
27M_CLK	27MHz clock out of the PLL-Master clock for the main processor (IC7503)
384FS_IN	SACD clock from DAC PCB
75HZ_PULSE	75Hz pulse to audio interface indication output
-8VSTBY	-8V power supply present during standby
A[20:1]	System address bus (EMI)
A1_MACE	Amplitude of the "land" reflection relative to the average EFM
AD[11:0]	SDRAM address bus
ALE	Address latch enable (servo processor)
ALPHA0	Generic name for the setpoint of the laser power absorption control
AM[7:0]	Latched low address bus to servo flash
AM[17:8]	High address bus to servo flash
AMD[7:0]	Multiplexed address data bus to servo flash
Ax	Central photodiode signal
B	Central photodiode signal
B_BCLK	Basic engine I2S bit clock
B_DATA	Basic engine I2S data
B_FLAG	Basic engine error flag
B_OUT	Video output blue from Sti5505
B_SYNC	Basic engine sector /abs time sync
B_V4	Basic engine versatile input pin
B_VID	Buffered video output Blue to A/V board
B_WCLK	Basic engine I2S word clock
BE1N_FUR	Upper byte enable of the Furore
BE0N_FUR	Lower byte enable of the Furore
C	Central photodiode signal
C_OUT	Chrominance output from Sti5505
C_VID	Buffered Chrominance output to A/V board
CALF_MACE	Central aperture low frequency control signal to MACE
CAS[1:0]ND	DRAM column address strobe
CASN	SDRAM column address strobe
CE_ROM1N	Chip enable flash eprom IC7401
CE_ROM2N	Chip enable flash eprom IC7451
CE_ROMN	Chip enable ROM memory (flash access)
CENTRE_ON	Control signal from Sti5505 to AV board to switch STEREO OUTPUT cinch to mono.
CFLG	Correction flag output
CFR	Control processor ready to accept data (S2B)
CLK	Clock for SDRAM memory
COSPH	Position Control Sledge in
CPUANALYSE	Control port P3 I/O from Sti5505
CPURESET	Control port P3 I/O to Sti5505
CSH_FUR	FURORE chip select the upper bank
CSI	Chip select input of HD61 (servo)
CSL_FUR	FURORE chip select the lower bank
CSN[2:1]	SDRAM chip select
CTS_SER	Clear to send control signal of service serial interface
CVBS	Buffered composite video output to A/V board
CVBS_OUT	Composite video output from Sti5505
D	Central photodiode signal
D[15:0]	System data bus (EMI)
DO_GRAB	Active data out of LLD (LossLess Decoder). Indication output
DQ[15:0]	SDRAM data bus
DQML	SDRAM data mask enable (Lower)
DQMU	SDRAM data mask enable (Upper)
DSD	Direct Stream Digital
DSD_CLK	DSD clock for DSD stereo signal
DSD_PCM[8:0]	DSD data
DSD_STR[1:0]	DSD stereo or downmix on DSD
DST	Direct Stream Transfer
DVD_LDN	Control signal from MACE to loader supply IC7107
E	Satellite photodiode signal
EMI_IRQN	Interrupt request, active low
ERROROUT	Control port P3 I/O from Sti5505
F	Satellite photodiode signal
FADE_BUSY	Indication that fade in/out is busy
FLASH_OEN	FLASH output enable control signal
FO	Focus actuator output
FOC-	Focus actuator negative connection
FOC+	Focus actuator positive connection
FUR_AD[13:0]	FURORE SDRAM address bus
FUR_CASN	Furore SDRAM column address strobe
FUR_CKE	Furore SDRAM clock enable
FUR_CLK	Furore SDRAM clock
FUR_DQ[15:0]	FURORE SDRAM data bus
FUR_DQMH	FURORE SDRAM data mask enable (Upper)
FUR_DQML	FURORE SDRAM data mask enable (Lower)
FUR_RASN	Furore SDRAM row address strobe
FUR_TDI	Boundary scan test data input FURORE
FUR_TMS	Boundary scan test mode select FURORE
FUR_TRST	Boundary scan test port reset FURORE
FUR_WEN	Furore SDRAM write enable
G_OUT	Video output green from Sti5505
G_VID	Buffered video output Green to A/V board
GND	Ground
GP_IN_PIN[3:0]	Furore general purpose input port
GP_OUT_PIN[3:0]	Furore general purpose output port
HPSW	Control signal to swith HF signal path
HSYNC	Horizontal synchronization output
I2C_DAC	Control signal to enable/disable the I2C bus to the DAC PCB
INT	Interrupt request
KAR_BY_PASS	Karaoke bypass control signal from Sti5505 to AV board.
LD-CD	CD laser out
LD-DVD	DVD laser out
LLD_MUTE	LossLess Decoder Mute, if "1" mute indication from audio interface
LRCLK	PCM Left/Right clock (word clock) to AV board
LRCLK_AV	PCM Left/Right clock (word clock) to AV board
LRCLK_FUR	PCM Left/Right clock (word clock) to the FURORE
LRCLKO	PCM Left/Right clock (word clock) output from STI5505
MON1	CD laser monitor
MON2	DVD laser monitor
MOTO1	Motor control signal
MUTE	Mute control signal
MUTE_AV	Mute control signal to AV board
MUTE_DET	Mute detection, mute 0x69 for all channels detection
O[4:1]	Servo current outputs for focus control
O-CENTRAL	Testpin for offset cancelation
OEND	DRAM output enable
OSLINKIN	Control port P3 I/O to Sti5505
OSLINKOUT	Control port P3 I/O from Sti5505
OTD-HD61	Off track detection
P50	Bi-directional interface used for communication between video equipment
PCM_CELF_FUR	I2S center/subwoofer serial data line
PCM_CLK_FUR	Audio system clock to FURORE
PCM_CLK_ST	Audio system clock to STI5505
PCM_LERI_FUR	I2S left right data line to the FURORE
PCM_LSRS_FUR	I2S left/right surround serial data line
PCM_OUT0	I2S audio serial data out of the STI5505
PCMCLK_AV	I2S audio system clock to A/V PCB
PCMOUT_AV	I2S audio serial output data to A/V PCB
PLAY	If "1" Fade circuit is in LLD mode, indication output
PLL_LOCK	Indication that PLL is in lock
PLL_SYNC	Sector sync found indication
POR	Power on reset
PORN	Power on reset active low
PROG_CLK384	Clock divided from 384*Fs = 16.9344 Hz
PROG_CLKSYS	Clock divide from system clock
PSENn	Program strobe enable (Servo)
PSP	Pit Signal Processing
PSP_ENABLE	If "1" PSP circuit is active, indication output
PWR_FAIL	Power fail control signal from PSU
R_OUT	Video output Red from Sti5505
R_VID	Buffered video output Red to A/V board
RA	Radial actuator control signal from servo processor to power driver
RAC-SW	Radial control switch
RAD-	Radial actuator negative connection
RAD+	Radial actuator positive connection
RAMAD[14:0]	RAM memory address bus (Servo)
RAMDA[7:0]	RAM memory data bus (Servo)
RAMRW	RAM memory read/write control signal (Servo)
RAS[1:0]ND	DRAM row address strobe
RASN	SDRAM row address strobe
RDI	Read enable input of HD61
REFCOS	Position Control Sledge external cosine offset compensation/stepper motor cosine output
REFSIN	Position Control Sledge external sine offset compensation/stepper motor sine output
RESET_I2C	Reset I2C -
Rfo	Amplified HF signal to HD61
RFP	Amplified HF signal for PSP recognition
RSTN	System reset
RTS_SER	Ready to send control signal of service serial interface
RWN	Read/Write control signal (EMI)
RXD_BE	Receive data of basic engine serial interface (S2B)
RXD_SER	Receive data of service serial interface
S[2:1]	Servo current outputs for radial tracking
SACD_CLK	SACD clock 16.394 MHz, CLK source of the system
SCART[1:0]	Scart control signals: slow blanking
SCL	I2C bus clock
SCL_DAC	I2C bus clock to DAC PCB
SCLK	PCM I2S serial bit clock
SCLK_AV	PCM I2S serial bit clock to A/V PCB
SCLK_FUR	PCM I2S serial bit clock to the FURORE
SCLKo	PCM I2S serial bit clock output from Sti5505
SDA	I2C bus data
SDA_DAC	I2C bus data to DAC PCB
SEL_ACLK1	Select audio clock 1
SEL_ACLK2	Select audio clock 2
SERVICE	Control signal of service serial interface
SICL	Serial interface clock input
SIDA	Serial interface data input
SILD	Serial interface load
SINPH	Position control sledge in
SL	Sledge actuator control signal from servo processor to power driver
SL-	Sledge actuator negative connection to sledge motor
SL+	Sledge actuator positive connection to sledge motor
SPDIF_AV	Digital audio to the A/V PCB
SPDIF_FUR	Digital audio to the FURORE
SPDIF_OUT	Digital output from STI5505
SSM_ACT	Indication new frame is being transmitted
ST_CLK	STI5505 system clock
ST_TDI	Boundary scan test data input to STI5505
STB_CONT	Standby control signal to power supply
STB_CONTD	Delayed standby control signal - enable or disable the clocks
STB_MUTE	Standby control signal mute
STB_OUT	Standby control signal to DAC PCB
STBY	Standby
SUR	Servo Unit Ready to accept data (S2B0
T[3:1]	Tacho control signals from HD61 to turntable motor driver
TCK	Boundary scan test clock
TDI	*Boundary scan test data input*
TDO	Boundary scan test data output
TMS	Boundary scan test mode select
TRAY1	Tray motor control signal 1 from servo processor to power driver

TRAY2	Tray motor control signal 2 from servo processor to power driver
TRAYSW	Tray switch control signal to servo processor
TRST	Boundary scan test port reset
TXD_BE	Transmitted data basic engine serial interface (S2B)
TXD_SER	Transmitted data service serial interface
VCC_FUR	Filtered power supply 3V3 to FURORE IC
VCC_LVC00	Filtered power supply 3V3 to IC7400
VCC3V3	Power supply 3V3
VCC5V	Power supply 5V to system clocks
VDD_DRAM	Power supply for DRAM 7450 (option)
VDD_MEM	Power supply for flashes 7401 and 7451
VDD_MEM2	Power supply for SDRAM
VDD_STI	Power supply for ST5505
VDDA_ADC	ADC power supply voltage 3V3 for FURORE
VDDA_AGC	AGC power supply voltage 3V3 for FURORE
VO2-	Tray motor negative connection
VO2+	Tray motor positive connection
V-REF	Reference voltage
VSYNC	Vertical synchronisation
-VVID	Negative reference voltage to video buffers
WAIT	Wait state request
WE	Servo flash Write Enable
WEN	Write enable control signal to SDRAM
WRI	Write enable input of HD61 (Servo)
Y_OUT	Luminance output from Sti5505
Y_VID	Buffered luminance output to A/V board

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10. Spare parts list

Mechanical

Various

0001	3104 127 11490	FRONT AL ASSY
0002	3104 127 12140	FRONT ASSY
0004	3104 127 12880	WINDOW ASSY
0006	3104 127 12150	HOLDER RIGHT COMPLETE
0007	3104 127 12270	POWER ON/OFF KNOB ASSY
0010	3104 124 05450	LIGHT CONDUCTOR
0012	3104 127 12160	HOLDER LEFT ASSY
0050	3104 120 00260	SA-CD BADGE
0065	3104 127 11520	TRAY FRONT COMPLETE SA-CD1000
0075	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0076	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0077	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0078	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0081	9305 023 61101	
0086	3104 126 25210	DUST CAP
0151	3104 127 11930	COVER ASSY
0251	3104 127 10740	FOOT SILVER ASSY
0252	3104 127 10740	FOOT SILVER ASSY
0253	3104 127 10740	FOOT SILVER ASSY
0254	3104 127 10740	FOOT SILVER ASSY
0301	3104 128 92800	MAINSCORD EU CLASS 1 NO GROUND
0309	3104 125 23810	USER MANUAL SACD EU (7-LANG)
0316	3104 128 92490	VIDEO CORD SET GOLD PLATED
0318	3104 207 10850	IRT PROD ASSY RC2055/ 01 PACKED
0320	4822 321 22611	
0321	4822 321 22611	
0322	4822 321 22611	
0323	4822 321 22611	
0324	4822 321 61452	
0325	4822 321 61847	SCART
1002	3104 128 06870	MONOBOARD 4285 ASSY SACD1000
1003	3104 128 06890	A/V BOARD 4225 MOVIE SACD1000
1004	3104 129 22150	PSU SACD1000 SRV1122WW MITSUMI
1007	3104 128 70230	TRAFO ASSY SACD NUVOTEM
8003	3104 157 11860	CWAS FLEX SACD 24 108 32S
8006	3104 157 11190	CWAS FLEX DVD 22 130 32S
8007	3104 157 11200	CWAS FLEX DVD 16 130 32S

Front part

Various

	3104 127 12270	POWER ON/OFF KNOB ASSY

VAL6011

Various

0001	3139 197 60096	GENEVA LP LOADER ASSY
0002	9305 022 60101	VAM6001/01
0003	3139 194 00710	SUSPENSION
0004	3139 194 00710	SUSPENSION
0005	3139 194 00620	SUSPENSION
0006	3139 194 00620	SUSPENSION
0007	3139 197 60060	CLAMPER ASSEMBLY

Loader

Various

0004	4822 358 10266	
0009	3139 198 80010	
0010	4822 532 13097	TULE
0011	3139 194 00270	
0012	3139 197 50060	

PCS PWB

Various

1001	4822 130 11531	SENSOR LT125A

DAC PWB

Various

1001	3104 128 06960	MJI DAC BOARD SACD
1002	3104 128 06970	MJI POWER SUPPLY SACD

Linear PSU

Various

031L	9965 000 06670	M1698-A NEJI TERMINAL

⊣⊢

C101	9965 000 06694	1800pF J 100V APSV
C102	4822 121 70437	1nF 5%
C103	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C104	4822 126 10513	47pF 5% 50V
C105	5322 126 10511	1nF 5% 50V
C111	4822 124 22039	1220 µF 16V
C112	4822 124 22039	1220 µF 16V
C151	9965 000 06694	1800pF J 100V APSV
C152	4822 121 70437	1nF 5%
C153	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C154	4822 126 10513	47pF 5% 50V
C155	5322 126 10511	1nF 5% 50V
C161	4822 124 22039	1220 µF 16V
C162	4822 124 22039	1220 µF 16V
C201	9965 000 06694	1800pF J 100V APSV
C202	4822 121 70437	1nF 5%
C203	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C204	4822 126 10513	47pF 5% 50V
C205	5322 126 10511	1nF 5% 50V
C211	4822 124 22039	1220 µF 16V
C212	4822 124 22039	1220 µF 16V
C251	9965 000 06694	1800pF J 100V APSV
C252	4822 121 70437	1nF 5%
C253	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C254	4822 126 10513	47pF 5% 50V
C255	5322 126 10511	1nF 5% 50V
C261	4822 124 22039	1220 µF 16V
C262	4822 124 22039	1220 µF 16V
C301	9965 000 06697	560pF J 100V APSV
C302	9965 000 03406	150pF J 100V APSV
C303	4822 126 10513	47pF 5% 50V
C317	9965 000 06697	560pF J 100V APSV
C318	5322 126 10511	1nF 5% 50V
C321	4822 124 22039	1220 µF 16V
C322	4822 124 22039	1220 µF 16V
C351	9965 000 06697	560pF J 100V APSV
C352	9965 000 03406	150pF J 100V APSV
C353	4822 126 10513	47pF 5% 50V
C367	9965 000 06697	560pF J 100V APSV
C368	5322 126 10511	1nF 5% 50V
C371	4822 124 22039	1220 µF 16V
C372	4822 124 22039	1220 µF 16V
C401	9965 000 06697	560pF J 100V APSV
C402	9965 000 03406	150pF J 100V APSV
C403	4822 126 10513	47pF 5% 50V
C417	9965 000 06697	560pF J 100V APSV
C418	5322 126 10511	1nF 5% 50V
C421	4822 124 22039	1220 µF 16V
C422	4822 124 22039	1220 µF 16V
C451	9965 000 06697	560pF J 100V APSV
C452	9965 000 03406	150pF J 100V APSV
C453	4822 126 10513	47pF 5% 50V
C467	9965 000 06697	560pF J 100V APSV
C468	5322 126 10511	1nF 5% 50V
C471	4822 124 22039	1220 µF 16V
C472	4822 124 22039	1220 µF 16V
C501	9965 000 06697	560pF J 100V APSV
C502	9965 000 03406	150pF J 100V APSV
C503	4822 126 10513	47pF 5% 50V
C517	9965 000 06697	560pF J 100V APSV
C518	5322 126 10511	1nF 5% 50V
C521	4822 124 22039	1220 µF 16V
C522	4822 124 22039	1220 µF 16V
C551	9965 000 06697	560pF J 100V APSV
C552	9965 000 03406	150pF J 100V APSV
C553	4822 126 10513	47pF 5% 50V
C567	9965 000 06697	560pF J 100V APSV
C568	5322 126 10511	1nF 5% 50V
C571	4822 124 22039	1220 µF 16V
C572	4822 124 22039	1220 µF 16V
C601	4822 124 80123	220µF 16V
C602	4822 124 80123	220µF 16V
C603	9965 000 01344	100pF 100V ECQ-P1101JZ
C611	4822 124 80123	220µF 16V
C612	4822 124 80123	220µF 16V
C613	9965 000 01344	100pF 100V ECQ-P1101JZ
C621	4822 124 80123	220µF 16V
C622	4822 124 80123	220µF 16V
C623	9965 000 01344	100pF 100V ECQ-P1101JZ
C631	4822 124 80123	220µF 16V
C632	4822 124 80123	220µF 16V
C633	9965 000 01344	100pF 100V ECQ-P1101JZ
C641	4822 124 80123	220µF 16V
C642	4822 124 80123	220µF 16V
C643	9965 000 01344	100pF 100V ECQ-P1101JZ
C651	4822 124 80123	220µF 16V
C652	4822 124 80123	220µF 16V
C653	9965 000 01344	100pF 100V ECQ-P1101JZ
C701	9965 000 06694	1800pF J 100V APSV
C702	4822 121 70437	1nF 5%
C703	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C704	4822 126 10513	47pF 5% 50V
C705	5322 126 10511	1nF 5% 50V
C711	4822 124 22039	1220 µF 16V
C712	4822 124 22039	1220 µF 16V
C751	9965 000 06694	1800pF J 100V APSV
C752	4822 121 70437	1nF 5%
C753	9965 000 05891	APSV 471J 470pF (TP) 100V PP
C754	4822 126 10513	47pF 5% 50V
C755	5322 126 10511	1nF 5% 50V
C761	4822 124 22039	1220 µF 16V
C762	4822 124 22039	1220 µF 16V
C801	4822 122 40617	0,1µF 50V
C802	4822 122 40617	0,1µF 50V
C803	4822 124 41458	4700µF 20% 16V
C804	4822 122 40617	0,1µF 50V
C805	4822 124 22039	1220 µF 16V
C806	4822 124 41458	4700µF 20% 16V
C814	4822 122 40617	0,1µF 50V
C815	4822 124 12404	220µF 20% 16V
C816	4822 122 40617	0,1µF 50V
C817	4822 124 90353	100 µF 10V
C818	4822 122 40617	0,1µF 50V
C821	4822 122 40617	0,1µF 50V
C822	4822 122 40617	0,1µF 50V
C823	9965 000 06700	1000µF 25V
C824	9965 000 06700	1000µF 25V
C825	9965 000 06700	1000µF 25V
C826	9965 000 06700	1000µF 25V
C827	4822 124 41535	100µF 25V
C828	4822 124 41535	100µF 25V
C829	4822 124 81144	1000µF 16V
C830	4822 124 81144	1000µF 16V
C841	4822 122 40617	0,1µF 50V
C842	4822 122 40617	0,1µF 50V
C843	4822 124 22723	1000µF 25V
C844	4822 122 40617	0.1µF 50V
C845	4822 124 12404	220µF 20% 16V
C846	4822 122 40617	0,1µF 50V
C851	4822 126 11703	0.01µF
C852	4822 126 11703	0.01µF
C853	4822 126 11703	0.01µF
C854	4822 126 11703	0.01µF

CD01	4822 124 41539	47µF 16V
CD02	4822 126 11687	
CD03	4822 122 33761	22pF 5% 50V
CD04	4822 122 33761	22pF 5% 50V
CD05	4822 126 11687	
CD06	4822 126 11687	
CD07	4822 126 11687	
CD08	9965 000 06692	20pF +-5% CH 50V
CD09	4822 126 11687	
CD11	4822 122 33753	150pF 5% 50V
CD12	4822 122 33753	150pF 5% 50V
CD17	4822 122 33753	150pF 5% 50V
CD18	4822 122 33753	150pF 5% 50V
CD21	4822 126 11687	
CD23	4822 124 22039	1220 µF 16V
CD24	9965 000 06693	47µF 16V ARA
CD41	4822 124 90353	100 µF 10V
CD42	4822 126 11687	
CD43	9965 000 01567	100 µF 10V ARA
CD44	4822 126 11687	
CD45	4822 126 11687	
CD46	9965 000 01567	100 µF 10V ARA
CD47	4822 126 11687	
CD48	4822 124 11947	10µF 20% 16V
CD49	4822 126 11687	
CD51	4822 124 90353	100 µF 10V
CD52	4822 126 11687	
CD53	9965 000 01567	100 µF 10V ARA
CD54	4822 126 11687	
CD55	4822 126 11687	
CD56	9965 000 01567	100 µF 10V ARA
CD57	4822 126 11687	
CD58	4822 124 11947	10µF 20% 16V
CD59	4822 126 11687	
CD61	4822 124 90353	100 µF 10V
CD62	4822 126 11687	
CD63	9965 000 01567	100 µF 10V ARA
CD64	4822 126 11687	
CD65	4822 126 11687	
CD66	9965 000 01567	100 µF 10V ARA
CD67	4822 126 11687	
CD68	4822 124 11947	10µF 20% 16V
CD69	4822 126 11687	
CD71	4822 126 11687	
CD72	4822 126 11687	
CD91	4822 126 11703	0.01µF
CD92	4822 126 11703	0.01µF
CD93	4822 126 11703	0.01µF
CD94	4822 126 11703	0.01µF
CD95	4822 126 11703	0.01µF
CD96	4822 126 11703	0.01µF
CN01	4822 124 41543	1µF 50V
CN02	4822 124 40763	2,2µF 100 V
CN03	4822 124 23649	470µF 25V
CN21	4822 124 80067	4,7µF 20% 63V
CN22	4822 124 22273	0.47µF 50V
CN23	5322 122 32654	63V 22nF PM10 R

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D101	4822 130 32362	MA165
D102	4822 130 81324	1SS302-X
D103	4822 130 81324	1SS302-X
D151	4822 130 32362	MA165
D152	4822 130 81324	1SS302-X
D153	4822 130 81324	1SS302-X
D201	4822 130 32362	MA165
D202	4822 130 81324	1SS302-X
D203	4822 130 81324	1SS302-X
D251	4822 130 32362	MA165
D252	4822 130 81324	1SS302-X
D253	4822 130 81324	1SS302-X
D301	4822 130 32362	MA165
D302	4822 130 81324	1SS302-X
D303	4822 130 81324	1SS302-X
D351	4822 130 32362	MA165
D352	4822 130 81324	1SS302-X
D353	4822 130 81324	1SS302-X
D401	4822 130 32362	MA165
D402	4822 130 81324	1SS302-X
D403	4822 130 81324	1SS302-X
D451	4822 130 32362	MA165
D452	4822 130 81324	1SS302-X
D453	4822 130 81324	1SS302-X
D501	4822 130 32362	MA165
D502	4822 130 81324	1SS302-X
D503	4822 130 81324	1SS302-X
D551	4822 130 32362	MA165
D552	4822 130 81324	1SS302-X
D553	4822 130 81324	1SS302-X
D601	4822 130 32362	MA165
D621	4822 130 32362	MA165
D641	4822 130 32362	MA165
D701	4822 130 32362	MA165
D702	4822 130 81324	1SS302-X
D703	4822 130 81324	1SS302-X
D751	4822 130 32362	MA165
D752	4822 130 81324	1SS302-X
D753	4822 130 81324	1SS302-X
D801▲	4822 130 82421	1D3
D802▲	4822 130 82421	1D3
D803▲	4822 130 82421	1D3
D804▲	4822 130 82421	1D3
D821▲	4822 130 82421	1D3
D822▲	4822 130 82421	1D3
D823▲	4822 130 82421	1D3
D824▲	4822 130 82421	1D3
D825	4822 130 80623	MTZ13B
D826	4822 130 80623	MTZ13B
D827	4822 130 32362	MA165
D828	4822 130 32362	MA165
D841▲	4822 130 82421	1D3
D842▲	4822 130 82421	1D3
D843▲	4822 130 82421	1D3
D844▲	4822 130 82421	1D3
DD21	4822 130 83715	1SS301
DD23▲	4822 130 82421	1D3
DH01	4822 130 82421	1D3
DN01	4822 130 82421	1D3
DN02	4822 130 82421	1D3
DN03	4822 130 82421	1D3
DN04	4822 130 82421	1D3
DN05	4822 130 82421	1D3
DN06	4822 130 32362	MA165
DN07	4822 130 32362	MA165
DN08	4822 130 33948	MTZJ5.6B
DN20	4822 130 83715	1SS301
DN31	4822 130 32362	MA165
DN32	4822 130 32362	MA165
DN33	4822 130 32362	MA165
F801▲	4822 070 32001	218.200(200MA)
F821▲	4822 070 38001	218.800(800MA)
F822▲	4822 070 38001	218.800(800MA)
F841▲	4822 070 34001	218.400(400MA)
FH01▲	9965 000 06705	T1A H 250V S505
GH05▲	9965 000 06706	10NF +-20% F AC250V

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L601	4822 116 82487	0R00
L602	9965 000 06669	ED2-12NU
L611	4822 116 82487	0R00
L621	4822 116 82487	0R00
L622	9965 000 06669	ED2-12NU
L631	4822 116 82487	0R00
L641	4822 116 82487	0R00
L642	9965 000 06669	ED2-12NU
L651	4822 116 82487	0R00
LD01	4822 158 60654	BLM31A02
LD02	4822 158 60654	BLM31A02
LD41	9965 000 03109	FB M J2125HM330-T
LD51	9965 000 03109	FB M J2125HM330-T
LD61	9965 000 03109	FB M J2125HM330-T
LH01▲	4822 157 70398	
LH02▲	4822 280 80754	VS-12MB
LN31	9965 000 06669	ED2-12NU
LN32	9965 000 06669	ED2-12NU
LN33	9965 000 06669	ED2-12NU

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Q101	4822 130 42843	2SK389
Q102	4822 130 61425	2SC2873
Q103	4822 130 63928	2SA1312(B)
Q104	4822 130 63928	2SA1312(B)
Q105	4822 130 63929	2SC3324(B)
Q106	5322 130 41844	2SK170BL
Q107	4822 130 62649	2SJ74
Q151	4822 130 42843	2SK389
Q152	4822 130 61425	2SC2873
Q153	4822 130 63928	2SA1312(B)
Q154	4822 130 63928	2SA1312(B)
Q155	4822 130 63929	2SC3324(B)
Q156	5322 130 41844	2SK170BL
Q157	4822 130 62649	2SJ74
Q201	4822 130 42843	2SK389
Q202	4822 130 61425	2SC2873
Q203	4822 130 63928	2SA1312(B)
Q204	4822 130 63928	2SA1312(B)
Q205	4822 130 63929	2SC3324(B)
Q206	5322 130 41844	2SK170BL
Q207	4822 130 62649	2SJ74
Q251	4822 130 42843	2SK389
Q252	4822 130 61425	2SC2873
Q253	4822 130 63928	2SA1312(B)
Q254	4822 130 63928	2SA1312(B)
Q255	4822 130 63929	2SC3324(B)
Q256	5322 130 41844	2SK170BL
Q257	4822 130 62649	2SJ74
Q301	4822 130 42843	2SK389
Q302	4822 130 61425	2SC2873
Q303	4822 130 63928	2SA1312(B)
Q304	4822 130 63928	2SA1312(B)
Q305	4822 130 63929	2SC3324(B)
Q306	5322 130 41844	2SK170BL
Q307	4822 130 62649	2SJ74
Q351	4822 130 42843	2SK389
Q352	4822 130 61425	2SC2873
Q353	4822 130 63928	2SA1312(B)
Q354	4822 130 63928	2SA1312(B)
Q355	4822 130 63929	2SC3324(B)
Q356	5322 130 41844	2SK170BL
Q357	4822 130 62649	2SJ74
Q401	4822 130 42843	2SK389
Q402	4822 130 61425	2SC2873
Q403	4822 130 63928	2SA1312(B)
Q404	4822 130 63928	2SA1312(B)
Q405	4822 130 63929	2SC3324(B)
Q406	5322 130 41844	2SK170BL
Q407	4822 130 62649	2SJ74
Q451	4822 130 42843	2SK389
Q452	4822 130 61425	2SC2873
Q453	4822 130 63928	2SA1312(B)
Q454	4822 130 63928	2SA1312(B)
Q455	4822 130 63929	2SC3324(B)
Q456	5322 130 41844	2SK170BL
Q457	4822 130 62649	2SJ74
Q501	4822 130 42843	2SK389
Q502	4822 130 61425	2SC2873
Q503	4822 130 63928	2SA1312(B)
Q504	4822 130 63928	2SA1312(B)
Q505	4822 130 63929	2SC3324(B)
Q506	5322 130 41844	2SK170BL
Q507	4822 130 62649	2SJ74
Q551	4822 130 42843	2SK389
Q552	4822 130 61425	2SC2873
Q553	4822 130 63928	2SA1312(B)
Q554	4822 130 63928	2SA1312(B)
Q555	4822 130 63929	2SC3324(B)
Q556	5322 130 41844	2SK170BL
Q557	4822 130 62649	2SJ74
Q701	4822 130 42843	2SK389
Q702	4822 130 61425	2SC2873
Q703	4822 130 63928	2SA1312(B)
Q704	4822 130 63928	2SA1312(B)
Q705	4822 130 63929	2SC3324(B)
Q706	5322 130 41844	2SK170BL
Q707	4822 130 62649	2SJ74
Q751	4822 130 42843	2SK389
Q752	4822 130 61425	2SC2873
Q753	4822 130 63928	2SA1312(B)
Q754	4822 130 63928	2SA1312(B)
Q755	4822 130 63929	2SC3324(B)
Q756	5322 130 41844	2SK170BL
Q757	4822 130 62649	2SJ74
Q801	9965 000 06702	PQ15RW11 3.0 15V VARIABLE REG.
Q811▲	4822 209 73096	NJM78M05FA
Q812	9965 000 03397	BA033FP 3.3V 1A PD=1W VD=0.3V
Q821▲	4822 130 62704	2SB1225
Q822▲	5322 130 41842	BDW93B
Q841▲	4822 209 82828	NJM78M12A
QD01	9965 000 06673	TC7WHU04FU
QD02	9965 000 04632	IC TC74VHC00FT
QD03	9965 000 04632	IC TC74VHC00FT
QD04	4822 130 61541	2SC4116(G)
QD05	9965 000 06674	TC7WH74FU
QD06	9965 000 06673	TC7WHU04FU
QD21	5322 209 11578	PCF8574T
QD22	4822 130 61541	2SC4116(G)
QD23	9965 000 03397	BA033FP 3.3V 1A PD=1W VD=0.3V
QD32	4822 130 61541	2SC4116(G)
QD41	9965 000 06675	CS4397 24BIT 192KHZ DAC
QD51	9965 000 06675	CS4397 24BIT 192KHZ DAC
QD61	9965 000 06675	CS4397 24BIT 192KHZ DAC
QD71	4822 130 61554	2SA1586(YG)
QD72	4822 130 61541	2SC4116(G)
QD73	4822 130 61541	2SC4116(G)
QD74	4822 130 61541	2SC4116(G)
QD75	4822 130 61554	2SA1586(YG)
QD76	4822 130 61541	2SC4116(G)
QD77	4822 130 61541	2SC4116(G)
QD78	4822 130 61541	2SC4116(G)
QN01	4822 130 61541	2SC4116(G)
QN02	4822 130 61541	2SC4116(G)
QN03	4822 130 61541	2SC4116(G)
QN04	4822 130 61554	2SA1586(YG)
QN05	4822 130 61541	2SC4116(G)
QN20	4822 209 83312	TA7317P TOSJ

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R101	9965 000 06695	1k Ω +-1% 1/4W
R102	9965 000 06695	1k Ω +-1% 1/4W
R103	9965 000 06695	1k Ω +-1% 1/4W
R104	4822 051 20121	120Ω 5% 0,1W
R105	4822 051 20121	120Ω 5% 0,1W
R106	4822 117 12521	68Ω 1% 0,1W
R107	4822 051 20228	2Ω2 5% 0,1W
R108	4822 051 20228	2Ω2 5% 0,1W
R109	4822 117 12367	33k 1% 0.10W
R110	4822 051 20102	1k 5% 0,1W
R111	4822 051 20102	1k 5% 0,1W
R112	4822 051 20101	100Ω 5% 0,1W
R113	9965 000 06696	10 Ω +-1% 1/4W
R114	9965 000 06696	10 Ω +-1% 1/4W
R151	9965 000 06695	1k Ω +-1% 1/4W
R152	9965 000 06695	1k Ω +-1% 1/4W
R153	9965 000 06695	1k Ω +-1% 1/4W
R154	4822 051 20121	120Ω 5% 0,1W
R155	4822 051 20121	120Ω 5% 0,1W
R156	4822 117 12521	68Ω 1% 0,1W
R157	4822 051 20228	2Ω2 5% 0,1W
R158	4822 051 20228	2Ω2 5% 0,1W
R159	4822 117 12367	33k 1% 0.10W
R160	4822 051 20102	1k 5% 0,1W
R161	4822 051 20102	1k 5% 0,1W
R162	4822 051 20101	100Ω 5% 0,1W
R163	9965 000 06696	10 Ω +-1% 1/4W
R164	9965 000 06696	10 Ω +-1% 1/4W
R201	9965 000 06695	1k Ω +-1% 1/4W
R202	9965 000 06695	1k Ω +-1% 1/4W
R203	9965 000 06695	1k Ω +-1% 1/4W
R204	4822 051 20121	120Ω 5% 0,1W
R205	4822 051 20121	120Ω 5% 0,1W
R206	4822 117 12521	68Ω 1% 0,1W
R207	4822 051 20228	2Ω2 5% 0,1W
R208	4822 051 20228	2Ω2 5% 0,1W
R209	4822 117 12367	33k 1% 0.10W
R210	4822 051 20102	1k 5% 0,1W
R211	4822 051 20102	1k 5% 0,1W
R212	4822 051 20101	100Ω 5% 0,1W
R213	9965 000 06696	10 Ω +-1% 1/4W
R214	9965 000 06696	10 Ω +-1% 1/4W
R251	9965 000 06695	1k Ω +-1% 1/4W
R252	9965 000 06695	1k Ω +-1% 1/4W
R253	9965 000 06695	1k Ω +-1% 1/4W
R254	4822 051 20121	120Ω 5% 0,1W
R255	4822 051 20121	120Ω 5% 0,1W
R256	4822 117 12521	68Ω 1% 0,1W
R257	4822 051 20228	2Ω2 5% 0,1W
R258	4822 051 20228	2Ω2 5% 0,1W
R259	4822 117 12367	33k 1% 0.10W
R260	4822 051 20102	1k 5% 0,1W
R261	4822 051 20102	1k 5% 0,1W
R262	4822 051 20101	100Ω 5% 0,1W
R263	9965 000 06696	10 Ω +-1% 1/4W
R264	9965 000 06696	10 Ω +-1% 1/4W
R301	9965 000 06695	1k Ω +-1% 1/4W
R302	9965 000 06690	2.61k Ω +-1% 1/4W
R303	9965 000 06691	6.65k Ω +-1% 1/4W
R304	4822 051 20121	120Ω 5% 0,1W
R305	4822 051 20121	120Ω 5% 0,1W
R306	4822 117 12521	68Ω 1% 0,1W
R307	4822 051 20228	2Ω2 5% 0,1W
R308	4822 051 20228	2Ω2 5% 0,1W
R309	4822 117 12367	33k 1% 0.10W
R310	4822 051 20102	1k 5% 0,1W
R311	4822 051 20102	1k 5% 0,1W
R312	4822 051 20101	100Ω 5% 0,1W
R313	9965 000 06696	10 Ω +-1% 1/4W
R314	9965 000 06696	10 Ω +-1% 1/4W
R315	9965 000 06698	10k Ω +-1% 1/4W
R316	9965 000 06695	1k Ω +-1% 1/4W
R317	9965 000 06695	1k Ω +-1% 1/4W
R351	9965 000 06695	1k Ω +-1% 1/4W
R352	9965 000 06690	2.61k Ω +-1% 1/4W
R353	9965 000 06691	6.65k Ω +-1% 1/4W
R354	4822 051 20121	120Ω 5% 0,1W
R355	4822 051 20121	120Ω 5% 0,1W
R356	4822 117 12521	68Ω 1% 0,1W
R357	4822 051 20228	2Ω2 5% 0,1W
R358	4822 051 20228	2Ω2 5% 0,1W
R359	4822 117 12367	33k 1% 0.10W
R360	4822 051 20102	1k 5% 0,1W
R361	4822 051 20102	1k 5% 0,1W
R362	4822 051 20101	100Ω 5% 0,1W
R363	9965 000 06696	10 Ω +-1% 1/4W
R364	9965 000 06696	10 Ω +-1% 1/4W
R365	9965 000 06698	10k Ω +-1% 1/4W
R366	9965 000 06695	1k Ω +-1% 1/4W
R367	9965 000 06695	1k Ω +-1% 1/4W
R401	9965 000 06695	1k Ω +-1% 1/4W
R402	9965 000 06690	2.61k Ω +-1% 1/4W
R403	9965 000 06691	6.65k Ω +-1% 1/4W
R404	4822 051 20121	120Ω 5% 0,1W
R405	4822 051 20121	120Ω 5% 0,1W
R406	4822 117 12521	68Ω 1% 0,1W
R407	4822 051 20228	2Ω2 5% 0,1W
R408	4822 051 20228	2Ω2 5% 0,1W
R409	4822 117 12367	33k 1% 0.10W
R410	4822 051 20102	1k 5% 0,1W
R411	4822 051 20102	1k 5% 0,1W
R412	4822 051 20101	100Ω 5% 0,1W
R413	9965 000 06696	10 Ω +-1% 1/4W
R414	9965 000 06696	10 Ω +-1% 1/4W
R415	9965 000 06698	10k Ω +-1% 1/4W
R416	9965 000 06695	1k Ω +-1% 1/4W
R417	9965 000 06695	1k Ω +-1% 1/4W
R451	9965 000 06695	1k Ω +-1% 1/4W
R452	9965 000 06690	2.61k Ω +-1% 1/4W
R453	9965 000 06691	6.65k Ω +-1% 1/4W
R454	4822 051 20121	120Ω 5% 0,1W
R455	4822 051 20121	120Ω 5% 0,1W
R456	4822 117 12521	68Ω 1% 0,1W
R457	4822 051 20228	2Ω2 5% 0,1W
R458	4822 051 20228	2Ω2 5% 0,1W
R459	4822 117 12367	33k 1% 0.10W
R460	4822 051 20102	1k 5% 0,1W
R461	4822 051 20102	1k 5% 0,1W
R462	4822 051 20101	100Ω 5% 0,1W
R463	9965 000 06696	10 Ω +-1% 1/4W
R464	9965 000 06696	10 Ω +-1% 1/4W
R465	9965 000 06698	10k Ω +-1% 1/4W
R466	9965 000 06695	1k Ω +-1% 1/4W
R467	9965 000 06695	1k Ω +-1% 1/4W
R501	9965 000 06695	1k Ω +-1% 1/4W
R502	9965 000 06690	2.61k Ω +-1% 1/4W
R503	9965 000 06691	6.65k Ω +-1% 1/4W
R504	4822 051 20121	120Ω 5% 0,1W
R505	4822 051 20121	120Ω 5% 0,1W
R506	4822 117 12521	68Ω 1% 0,1W
R507	4822 051 20228	2Ω2 5% 0,1W
R508	4822 051 20228	2Ω2 5% 0,1W
R509	4822 117 12367	33k 1% 0.10W
R510	4822 051 20102	1k 5% 0,1W
R511	4822 051 20102	1k 5% 0,1W
R512	4822 051 20101	100Ω 5% 0,1W
R513	9965 000 06696	10 Ω +-1% 1/4W
R514	9965 000 06696	10 Ω +-1% 1/4W
R515	9965 000 06698	10k Ω +-1% 1/4W
R516	9965 000 06695	1k Ω +-1% 1/4W
R517	9965 000 06695	1k Ω +-1% 1/4W
R551	9965 000 06695	1k Ω +-1% 1/4W
R552	9965 000 06690	2.61k Ω +-1% 1/4W
R553	9965 000 06691	6.65k Ω +-1% 1/4W
R554	4822 051 20121	120Ω 5% 0,1W
R555	4822 051 20121	120Ω 5% 0,1W
R556	4822 117 12521	68Ω 1% 0,1W
R557	4822 051 20228	2Ω2 5% 0,1W
R558	4822 051 20228	2Ω2 5% 0,1W
R559	4822 117 12367	33k 1% 0.10W
R560	4822 051 20102	1k 5% 0,1W
R561	4822 051 20102	1k 5% 0,1W
R562	4822 051 20101	100Ω 5% 0,1W
R563	9965 000 06696	10 Ω +-1% 1/4W
R564	9965 000 06696	10 Ω +-1% 1/4W
R565	9965 000 06698	10k Ω +-1% 1/4W
R566	9965 000 06695	1k Ω +-1% 1/4W
R567	9965 000 06695	1k Ω +-1% 1/4W
R601	9965 000 06687	33.2 Ω +-1% 1/4W
R602	4822 117 10833	10k 1% 0,1W
R603	4822 111 90896	100k 5% 0.1W
R611	9965 000 06687	33.2 Ω +-1% 1/4W
R612	4822 117 10833	10k 1% 0,1W
R613	4822 111 90896	100k 5% 0.1W
R621	9965 000 06687	33.2 Ω +-1% 1/4W
R622	4822 117 10833	10k 1% 0,1W
R623	4822 111 90896	100k 5% 0.1W
R631	9965 000 06687	33.2 Ω +-1% 1/4W
R632	4822 117 10833	10k 1% 0,1W
R633	4822 111 90896	100k 5% 0.1W
R641	9965 000 06687	33.2 Ω +-1% 1/4W
R642	4822 117 10833	10k 1% 0,1W
R643	4822 111 90896	100k 5% 0.1W
R651	9965 000 06687	33.2 Ω +-1% 1/4W
R652	4822 117 10833	10k 1% 0,1W
R653	4822 111 90896	100k 5% 0.1W
R701	9965 000 06695	1k Ω +-1% 1/4W
R702	9965 000 06695	1k Ω +-1% 1/4W
R703	9965 000 06695	1k Ω +-1% 1/4W
R704	4822 051 20121	120Ω 5% 0,1W
R705	4822 051 20121	120Ω 5% 0,1W
R706	4822 117 12521	68Ω 1% 0,1W
R707	4822 051 20228	2Ω2 5% 0,1W
R708	4822 051 20228	2Ω2 5% 0,1W
R709	4822 117 12367	33k 1% 0.10W
R710	4822 051 20102	1k 5% 0,1W
R711	4822 051 20102	1k 5% 0,1W
R712	4822 051 20101	100Ω 5% 0,1W
R713	9965 000 06696	10 Ω +-1% 1/4W
R714	9965 000 06696	10 Ω +-1% 1/4W
R751	9965 000 06695	1k Ω +-1% 1/4W
R752	9965 000 06695	1k Ω +-1% 1/4W
R753	9965 000 06695	1k Ω +-1% 1/4W
R754	4822 051 20121	120Ω 5% 0,1W
R755	4822 051 20121	120Ω 5% 0,1W
R756	4822 117 12521	68Ω 1% 0,1W
R757	4822 051 20228	2Ω2 5% 0,1W
R758	4822 051 20228	2Ω2 5% 0,1W
R759	4822 117 12367	33k 1% 0.10W
R760	4822 051 20102	1k 5% 0,1W
R761	4822 051 20102	1k 5% 0,1W
R762	4822 051 20101	100Ω 5% 0,1W
R763	9965 000 06696	10 Ω +-1% 1/4W
R764	9965 000 06696	10 Ω +-1% 1/4W
R801	9965 000 06703	1.2k Ω +-1% 1/10W
R802	9965 000 06703	1.2k Ω +-1% 1/10W
R804	9965 000 06704	2.2k Ω +-1% 1/10W
R823	4822 116 52228	680Ω 5% 0,5W
R824	4822 116 52228	680Ω 5% 0,5W
RD01	4822 051 30105	1M 5% 0,062W
RD02	4822 051 30221	220Ω 5% 0,062W
RD03	4822 116 82487	0Ω
RD04	4822 051 30479	47Ω 5% 0,062W
RD05	4822 051 30479	47Ω 5% 0,062W
RD06	4822 051 30479	47Ω 5% 0,062W
RD07	4822 051 30223	22k 5% 0,062W
RD08	4822 051 30223	22k 5% 0,062W
RD09	4822 051 30479	47Ω 5% 0,062W
RD11	4822 051 30339	33Ω 5% 0,062W
RD12	4822 051 30339	33Ω 5% 0,062W
RD13	4822 051 30339	33Ω 5% 0,062W
RD14	4822 051 30339	33Ω 5% 0,062W
RD15	4822 051 30339	33Ω 5% 0,062W
RD16	4822 051 30339	33Ω 5% 0,062W
RD17	4822 051 30339	33Ω 5% 0,062W
RD18	4822 051 30339	33Ω 5% 0,062W
RD21	4822 051 30223	22k 5% 0,062W
RD22	4822 051 30223	22k 5% 0,062W
RD26	4822 051 30223	22k 5% 0,062W
RD27	4822 051 30223	22k 5% 0,062W
RD28	4822 051 30223	22k 5% 0,062W
RD29	4822 051 30223	22k 5% 0,062W
RD30	4822 051 30223	22k 5% 0,062W
RD33	4822 051 30563	56k 5% 0,062W
RD34	4822 051 30472	4k7 5% 0,062W
RD41	4822 116 82487	0Ω
RD42	4822 116 82487	0Ω
RD43	4822 051 30223	22k 5% 0,062W
RD44	9965 000 06688	3.24k Ω +-1% 1/10W
RD45	9965 000 06689	2.21k Ω +-1% 1/10W
RD46	4822 051 30102	1k 5% 0,062W
RD51	4822 116 82487	0Ω
RD52	4822 051 30223	22k 5% 0,062W
RD53	4822 051 30223	22k 5% 0,062W

RD54	9965 000 06688	3.24k Ω +-1% 1/10W
RD55	9965 000 06689	2.21k Ω +-1% 1/10W
RD56	4822 051 30102	1k 5% 0,062W
RD61	4822 051 30223	22k 5% 0,062W
RD62	4822 116 82487	0Ω
RD63	4822 051 30223	22k 5% 0,062W
RD64	9965 000 06688	3.24k Ω +-1% 1/10W
RD65	9965 000 06689	2.21k Ω +-1% 1/10W
RD66	4822 051 30102	1k 5% 0,062W
RD71	4822 051 30223	22k 5% 0,062W
RD72	4822 051 30223	22k 5% 0,062W
RD73	4822 051 30223	22k 5% 0,062W
RD74	4822 051 30223	22k 5% 0,062W
RD75	4822 051 30223	22k 5% 0,062W
RD76	4822 051 30101	100Ω 5% 0,062W
RD77	4822 051 30223	22k 5% 0,062W
RD78	4822 051 30102	1k 5% 0,062W
RD79	4822 117 12139	22Ω 5% 0,062W
RD80	4822 117 12891	220k 1% ERJ3Ω
RD81	4822 051 30223	22k 5% 0,062W
RD82	4822 051 30223	22k 5% 0,062W
RD83	4822 051 30223	22k 5% 0,062W
RD84	4822 051 30223	22k 5% 0,062W
RD85	4822 051 30223	22k 5% 0,062W
RD86	4822 051 30101	100Ω 5% 0,062W
RD87	4822 051 30223	22k 5% 0,062W
RD88	4822 051 30102	1k 5% 0.062W
RD89	4822 117 12139	22Ω 5% 0,062W
RD90	4822 117 12891	220k 1% ERJ3Ω
RN01	4822 051 30102	1k 5% 0,062W
RN02	9965 000 06699	3.9M Ω +-5% 1/16W
RN03	4822 116 83819	18k 5% 0.06W
RN04	4822 117 12925	47k 1% 0.063W 0603
RN05	4822 051 30103	10k 5% 0,062W
RN06	4822 051 30222	2k2 5% 0,062W
RN07	4822 051 30103	10k 5% 0,062W
RN08	4822 051 30472	4k7 5% 0,062W
RN09	4822 051 30472	4k7 5% 0,062W
RN10	4822 051 30223	22k 5% 0,062W
RN21	4822 051 30332	3k3 5% 0,062W
RN22	4822 051 30332	3k3 5% 0,062W
RN23	4822 117 13632	100k 1% 0603 0.62W
RN24	4822 117 12925	47k 1% 0.063W 0603
RN25	4822 051 30333	33k 5% 0,062W
RN26	4822 051 30103	10k 5% 0,062W
RN27	4822 117 13632	100k 1% 0603 0.62W
SD71	9965 000 06676	SLIDE SW. SSSF113-S06N1
SH02▲	4822 277 21825	SW 115/220V
XD01	9965 000 06677	16.9344MHz UM-5

AV PWB

Various

1300	4822 265 11154	52030-2210 (22P)
1301	4822 265 11103	52030-1610 (16P)
1303	4822 267 10994	4P, MDIN
1304	2422 033 00334	CON BM EURO H 42P F BK GRND-L
1402	2422 026 05089	CON BM CINCH H 3P F RDWHYE B
1405	4822 267 31729	

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2308	4822 122 33575	220pF 5% 63V CASE
2314	4822 124 41584	100µF 20% 10V
2337	4822 122 33575	220pF 5% 63V CASE
2351	4822 126 14585	100nF 10% 50V
2352	4822 126 14585	100nF 10% 50V
2353	4822 124 40769	4.7µF 20% 100V
2354	4822 126 14076	220nF 25V. P8020
2355	4822 124 40769	4.7µF 20% 100V
2357	4822 124 40769	4.7µF 20% 100V
2358	4822 122 33575	220pF 5% 63V CASE
2359	4822 124 40769	4.7µF 20% 100V
2360	4822 126 13692	47pF 1% 63V
2361	4822 126 13692	47pF 1% 63V
2362	4822 126 14585	100nF 10% 50V
2363	4822 126 14585	100nF 10% 50V
2364	4822 124 41584	100µF 20% 10V
2365	5322 122 32654	63V 22nF PM10 R
2366	4822 122 33575	220pF 5% 63V CASE
2367	4822 126 14585	100nF 10% 50V
2368	4822 122 33575	220pF 5% 63V CASE
2369	4822 122 33575	220pF 5% 63V CASE
2370	4822 124 40248	10µF 20% 63V
2371	4822 122 33575	220pF 5% 63V CASE
2372	4822 124 40769	4.7µF 20% 100V
2373	4822 124 40769	4.7µF 20% 100V
2374	4822 126 14076	220nF 25V. P8020
2375	4822 122 33575	220pF 5% 63V CASE
2376	4822 124 40248	10µF 20% 63V
2377	4822 122 33575	220pF 5% 63V CASE
2378	4822 124 40769	4.7µF 20% 100V
2379	4822 126 14585	100nF 10% 50V
2380	4822 126 14585	100nF 10% 50V
2381	4822 126 14585	100nF 10% 50V
2382	4822 124 40769	4.7µF 20% 100V
2383	4822 124 40769	4.7µF 20% 100V
2384	4822 126 14583	470nF 10% 16V XTR
2385	4822 124 40769	4.7µF 20% 100V
2386	4822 126 14583	470nF 10% 16V XTR
2387	4822 126 14583	470nF 10% 16V XTR
2388	4822 126 14076	220nF 25V. P8020
2389	4822 126 14583	470nF 10% 16V XTR
2390	4822 122 33177	10nF 20% 50V
2391	4822 122 33177	10nF 20% 50V
2392	4822 126 14583	470nF 10% 16V XTR
2393	4822 122 33177	10nF 20% 50V
2394	4822 126 14076	220nF 25V. P8020
2395	4822 122 33575	220pF 5% 63V CASE
2396	4822 124 40248	10µF 20% 63V
2397	4822 122 33177	10nF 20% 50V
2398	4822 122 33177	10nF 20% 50V
2399	4822 124 40248	10µF 20% 63V
2400	4822 122 33177	10nF 20% 50V
2401	4822 126 14583	470nF 10% 16V XTR
2402	4822 122 33575	220pF 5% 63V CASE
2403	4822 126 14076	220nF 25V. P8020
2404	4822 122 33575	220pF 5% 63V CASE
2405	4822 126 13692	47pF 1% 63V
2406	4822 126 13692	47pF 1% 63V
2407	4822 126 14583	470nF 10% 16V XTR
2408	4822 122 33575	220pF 5% 63V CASE
2409	4822 122 33575	220pF 5% 63V CASE
2410	4822 122 33575	220pF 5% 63V CASE
2411	4822 124 40248	10µF 20% 63V
2412	4822 124 40433	47µF 20% 25V
2413	5322 122 32531	100pF 5% 50V
2414	5322 122 32531	100pF 5% 50V
2415	4822 124 40248	10µF 20% 63V
2416	4822 126 14585	100nF 10% 50V
2417	4822 126 14585	100nF 10% 50V
2418	4822 126 14583	470nF 10% 16V XTR
2419	4822 124 40433	47µF 20% 25V
2450	5322 122 32654	63V 22nF PM10 R
2452	4822 126 14076	220nF 25V. P8020
2453	4822 124 40433	47µF 20% 25V
2455	5322 122 32531	100pF 5% 50V
2456	4822 124 22339	100UE 16V
2457	5322 126 10511	1nF 5% 50V
2458	5322 122 32654	63V 22nF PM10 R
2459	5322 122 32531	100pF 5% 50V
2460	5322 122 32654	63V 22nF PM10 R
2461	5322 122 32531	100pF 5% 50V
2462	4822 124 22339	100UE 16V
2463	5322 126 10511	1nF 5% 50V
2464	5322 122 32531	100pF 5% 50V
2465	5322 122 32654	63V 22nF PM10 R
2468	5322 122 32654	63V 22nF PM10 R
2469	5322 122 32654	63V 22nF PM10 R
2470	5322 122 32654	63V 22nF PM10 R
2471	4822 126 14585	100nF 10% 50V
2472	4822 124 40433	47µF 20% 25V
2473	5322 122 32654	63V 22nF PM10 R
2474	4822 124 40433	47µF 20% 25V
2475	4822 124 40433	47µF 20% 25V
2476	4822 124 22339	100UE 16V
2479	5322 122 32654	63V 22nF PM10 R
2480	5322 122 32531	100pF 5% 50V
2483	4822 124 22339	100UE 16V
2488	4822 126 14585	100nF 10% 50V
2489	4822 126 14585	100nF 10% 50V
2490	4822 124 40433	47µF 20% 25V
2491	4822 124 41584	100µF 20% 10V
2493	4822 126 13692	47pF 1% 63V
2495	4822 124 40248	10µF 20% 63V

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3300	4822 117 10353	150Ω 1% 0.1W
3301	4822 051 20101	100Ω 5% 0.1W
3302	4822 051 20101	100Ω 5% 0.1W
3303	4822 117 11927	75Ω 1% 0.1W
3304	4822 117 11507	6k8 1% 0.1W
3305	4822 117 11454	820Ω 1% 0.1W
3306	4822 051 20471	470Ω 5% 0.1W
3307	4822 051 20472	4k7 5% 0.1W
3308	4822 117 10361	680Ω 1% 0.1W
3309	4822 117 10353	150Ω 1% 0.1W
3310	4822 117 11927	75Ω 1% 0.1W
3312	4822 117 11503	220Ω 1% 0.1W
3313	4822 051 20391	390Ω 5% 0.1W
3314	4822 051 10102	1k 2% 0.25W
3315	4822 051 20471	470Ω 5% 0.1W
3316	4822 117 10834	47k 1% 0.1W
3318	4822 117 10834	47k 1% 0.1W
3319	4822 051 10102	1k 2% 0.25W
3320	4822 117 10834	47k 1% 0.1W
3321	4822 051 20101	100Ω 5% 0.1W
3322	4822 051 20101	100Ω 5% 0.1W
3323	4822 051 20471	470Ω 5% 0.1W
3325	4822 117 10834	47k 1% 0.1W
3327	4822 117 11927	75Ω 1% 0.1W
3329	4822 051 20471	470Ω 5% 0.1W
3330	4822 117 11927	75Ω 1% 0.1W
3331	4822 117 11145	4k7 1% 0.1W
3332	4822 051 20471	470Ω 5% 0.1W
3333	4822 117 10353	150Ω 1% 0.1W
3334	4822 117 10357	4k3 1% 0.2W
3335	4822 051 20471	470Ω 5% 0.1W
3336	4822 117 11927	75Ω 1% 0.1W
3338	4822 117 10833	10k 1% 0.1W
3339	4822 051 20101	100Ω 5% 0.1W
3340	4822 051 20101	100Ω 5% 0.1W
3341	4822 117 10833	10k 1% 0.1W
3342	4822 051 20471	470Ω 5% 0.1W
3343	4822 117 11927	75Ω 1% 0.1W
3345	4822 117 11927	75Ω 1% 0.1W
3347	4822 051 20471	470Ω 5% 0.1W
3348	4822 051 10102	1k 2% 0.25W
3349	4822 117 10834	47k 1% 0.1W
3350	4822 117 10833	10k 1% 0.1W
3351	4822 051 20471	470Ω 5% 0.1W
3352	4822 051 20562	5k6 5% 0.1W 0805
3353	4822 051 10102	1k 2% 0.25W
3354	4822 117 11927	75Ω 1% 0.1W
3355	4822 051 20339	33Ω 5% 0.1W
3356	4822 051 20472	4k7 5% 0.1W
3357	4822 051 20472	4k7 5% 0.1W
3359	4822 117 10834	47k 1% 0.1W
3360	4822 051 20471	470Ω 5% 0.1W
3362	4822 051 20471	470Ω 5% 0.1W
3363	4822 051 10102	1k 2% 0.25W
3364	4822 117 11148	56k 1% 0.1W
3365	4822 051 20561	560Ω 5% 0.1W
3366	4822 117 10834	47k 1% 0.1W
3367	4822 117 12955	2k7 1% 0.1W 0805
3368	4822 117 12955	2k7 1% 0.1W 0805
3378	4822 051 10102	1k 2% 0.25W
3394	4822 051 20471	470Ω 5% 0.1W
3395	4822 051 20472	4k7 5% 0.1W
3397	4822 117 10834	47k 1% 0.1W
3398	4822 051 20472	4k7 5% 0.1W
3399	4822 051 20562	5k6 5% 0.1W 0805
3400	4822 117 11927	75Ω 1% 0.1W
3401	4822 117 11927	75Ω 1% 0.1W
3402	4822 051 20472	4k7 5% 0.1W
3403	4822 117 11927	75Ω 1% 0.1W
3404	4822 117 11927	75Ω 1% 0.1W
3405	4822 117 11927	75Ω 1% 0.1W
3406	4822 117 11927	75Ω 1% 0.1W
3407	4822 117 11927	75Ω 1% 0.1W
3408	4822 117 11927	75Ω 1% 0.1W
3409	4822 051 20471	470Ω 5% 0.1W
3410	4822 051 20471	470Ω 5% 0.1W
3411	4822 117 11927	75Ω 1% 0.1W
3413	4822 117 10834	47k 1% 0.1W
3414	4822 051 20472	4k7 5% 0.1W
3415	4822 051 20223	22k 5% 0.1W
3416	4822 051 20339	33Ω 5% 0.1W
3417	4822 051 20471	470Ω 5% 0.1W
3418	4822 051 20101	100Ω 5% 0.1W
3419	4822 051 20101	100Ω 5% 0.1W
3420	4822 117 11149	82k 1% 0.1W
3421	4822 117 11504	270Ω 1% 0.1W
3422	4822 051 20472	4k7 5% 0.1W
3423	4822 117 11148	56k 1% 0.1W
3424	4822 051 20223	22k 5% 0.1W
3425	4822 117 11927	75Ω 1% 0.1W
3427	4822 051 20472	4k7 5% 0.1W
3429	4822 117 11927	75Ω 1% 0.1W
3431	4822 051 20471	470Ω 5% 0.1W
3432	4822 117 11927	75Ω 1% 0.1W
3433	4822 051 20008	0Ω jumper . (0805)
3434	4822 051 20101	100Ω 5% 0.1W
3435	4822 051 20101	100Ω 5% 0.1W
3436	4822 117 10353	150Ω 1% 0.1W
3437	4822 051 20101	100Ω 5% 0.1W
3438	4822 051 20101	100Ω 5% 0.1W
3439	4822 051 20101	100Ω 5% 0.1W
3440	4822 051 20101	100Ω 5% 0.1W
3441	4822 051 20101	100Ω 5% 0.1W
3442	4822 051 20101	100Ω 5% 0.1W
3444	4822 117 10833	10k 1% 0.1W
3445	4822 117 10833	10k 1% 0.1W
3448	4822 051 20332	3k3 5% 0.1W
3451	4822 117 13085	5k6 1% RC12H 0.1W 0805
3452	4822 051 20008	0Ω jumper . (0805)
3453	4822 117 10833	10k 1% 0.1W
3454	4822 117 10833	10k 1% 0.1W
3455	4822 051 20332	3k3 5% 0.1W
3456	4822 051 20101	100Ω 5% 0.1W
3457	4822 051 20101	100Ω 5% 0.1W
3458	4822 051 20008	0Ω jumper . (0805)
3459	4822 117 13085	5k6 1% RC12H 0.1W 0805
3460	4822 051 20008	0Ω jumper . (0805)
3461	4822 117 10833	10k 1% 0.1W
3464	4822 117 10833	10k 1% 0.1W
3468	4822 117 10837	100k 1% 0.1W
3471	4822 051 20562	5k6 5% 0.1W 0805
3472	4822 117 11152	4Ω7 5%
3473	4822 051 20008	0Ω jumper . (0805)
3476	4822 051 20101	100Ω 5% 0.1W
3477	4822 051 20101	100Ω 5% 0.1W
3478	4822 117 10837	100k 1% 0.1W
3479	4822 051 20562	5k6 5% 0.1W 0805
3479	4822 117 11142	2k4 1% 0.1W
3481	4822 117 12955	2k7 1% 0.1W 0805
3482	4822 117 10833	10k 1% 0.1W
3482	4822 117 11146	6k2 1% 0.1W
3486	4822 117 10837	100k 1% 0.1W
3489	4822 051 20562	5k6 5% 0.1W 0805
3491	4822 051 20101	100Ω 5% 0.1W
3492	4822 051 20101	100Ω 5% 0.1W
3494	4822 117 12955	2k7 1% 0.1W 0805
3495	4822 117 10837	100k 1% 0.1W
3498	4822 051 20562	5k6 5% 0.1W 0805
3505	4822 051 20101	100Ω 5% 0.1W
3506	4822 117 10833	10k 1% 0.1W
3507	4822 051 20101	100Ω 5% 0.1W
3508	4822 117 12521	68Ω 1% 0.1W
3509	4822 117 10834	47k 1% 0.1W
3510	4822 117 11152	4Ω7 5%
3513	4822 117 12955	2k7 1% 0.1W 0805
3514	4822 117 12955	2k7 1% 0.1W 0805
3515	4822 117 10837	100k 1% 0.1W
3516	4822 117 11152	4Ω7 5%
3517	4822 051 20101	100Ω 5% 0.1W
3518	4822 117 12955	2k7 1% 0.1W 0805
3519	4822 051 20562	5k6 5% 0.1W 0805
3520	4822 051 20472	4k7 5% 0.1W
3521	4822 051 10102	1k 2% 0.25W
3522	4822 051 10102	1k 2% 0.25W
3524	4822 051 20008	0Ω jumper . (0805)
3525	4822 117 10833	10k 1% 0.1W
3527	4822 117 10834	47k 1% 0.1W
3600	4822 051 20472	4k7 5% 0.1W
3601	4822 051 20472	4k7 5% 0.1W
3602	4822 051 20472	4k7 5% 0.1W
3603	4822 117 10837	100k 1% 0.1W
3604	4822 117 11449	2k2 5% 0.1W 0805
3605	4822 051 20472	4k7 5% 0.1W
3606	4822 051 20561	560Ω 5% 0.1W
3607	4822 051 20562	5k6 5% 0.1W 0805
3608	4822 117 10837	100k 1% 0.1W
3609	4822 051 20822	8k2 5% 0.1W
3610	4822 051 20472	4k7 5% 0.1W
3611	4822 051 20472	4k7 5% 0.1W
3612	4822 117 10833	10k 1% 0.1W
3613	4822 117 12955	2k7 1% 0.1W 0805
3614	4822 117 10833	10k 1% 0.1W
3615	4822 117 11152	4Ω7 5%
3616	4822 051 20472	4k7 5% 0.1W
3617	4822 117 10833	10k 1% 0.1W
3618	4822 117 10361	680Ω 1% 0.1W
3619	4822 117 10833	10k 1% 0.1W
3620	4822 051 10008	0Ω 5% 0.25W
3621	4822 051 20472	4k7 5% 0.1W
3622	4822 117 10833	10k 1% 0.1W
3623	4822 117 11139	1k5 1% 0.1W
3624	4822 117 10833	10k 1% 0.1W
3625	4822 051 10102	1k 2% 0.25W
3628	4822 117 11139	1k5 1% 0.1W
3999	4822 117 12842	
4xxx	4822 051 10008	0Ω 5% 0.25W (1206)
4xxx	4822 051 20008	0Ω 5% 0.25W (0805)

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5400	4822 157 70601	100µH (920927085A)

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6300	3198 020 55680	DIO REG SM BZX384-C5V6 COL R
6301	4822 130 83757	BAS216
6302	4822 130 83757	BAS216
6303	4822 130 83757	BAS216
6306	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6307	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6308	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6309	4822 130 11383	BZX284-C5V1
6400	4822 130 10845	GP1F32T

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7300	4822 130 60373	BC856B
7301	5322 130 60159	BC846B
7302	5322 130 60159	BC846B
7303	5322 130 60159	BC846B
7304	9322 134 86668	LF80C
7305	9322 135 58671	IC SM STV6410AD (ST00) Y
7306	5322 130 60159	BC846B
7307	5322 130 60159	BC846B
7308	5322 130 60159	BC846B
7309	5322 130 60159	BC846B
7310	5322 130 60159	BC846B
7311	5322 130 60159	BC846B
7312	4822 130 60373	BC856B
7313	5322 130 60159	BC846B
7314	4822 130 42804	BC817-25
7315	4822 130 42804	BC817-25
7316	4822 209 16256	TDA4780/V4
7320	5322 130 60159	BC846B
7321	4822 130 42804	BC817-25
7322	5322 130 60159	BC846B
7324	4822 130 42804	BC817-25
7325	5322 130 60159	BC846B
7326	4822 130 60373	BC856B
7327	5322 130 60159	BC846B
7328	5322 130 60159	BC846B
7329	5322 130 60159	BC846B
7330	5322 130 60159	BC846B
7331	4822 130 40981	BC337-25
7332	4822 130 60373	BC856B
7333	4822 130 41246	BC327-25
7334	5322 130 60159	BC846B
7335	5322 130 60159	BC846B
7336	4822 130 42804	BC817-25
7337	4822 130 42804	BC817-25
7400	4822 209 17398	LD1117DT33
7401	4822 209 17423	UAD1328T
7402	4822 130 42804	BC817-25
7403	4822 209 32071	MC33079D
7408	4822 209 32071	MC33079D
7413	5322 209 14481	HEF4053BT
7414	4822 209 30095	LM833D
7415	4822 130 42804	BC817-25
7416	4822 130 42804	BC817-25
7417	4822 130 60373	BC856B
7419	4822 130 42804	BC817-25
7420	4822 130 42804	BC817-25
7421	4822 130 42804	BC817-25
7422	4822 130 44568	BC557B
7423	5322 130 60159	BC846B

Display PWB

Various

0004	3104 124 05420	FTD HOLDER
1100	4822 276 13732	SWITCH TACT PUSH
1102	4822 276 13732	SWITCH TACT PUSH
1106	4822 276 13732	SWITCH TACT PUSH
1107	4822 276 13732	SWITCH TACT PUSH
1108	4822 276 13732	SWITCH TACT PUSH
1109	4822 276 13732	SWITCH TACT PUSH
1110	2422 540 98423	RES CER 8MHz CSTS*MHz 03
1112	4822 276 13732	SWITCH TACT PUSH
1113	2722 171 07718	15-MT67GNK
1114	4822 276 13732	SWITCH TACT PUSH
1116	4822 276 13732	SWITCH TACT PUSH
1160	2422 128 02929	SWI PUSH 2P 0.1A 30V SPPH43 B

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2100	4822 122 33575	220pF 5% 63V CASE
2101	4822 122 33575	220pF 5% 63V CASE
2102	5322 122 32531	100pF 5% 50V
2103	5322 122 32531	100pF 5% 50V
2104	5322 122 32531	100pF 5% 50V
2105	4822 126 12105	50V 33nF PM5
2106	4822 124 81286	47µF 20% 16V
2107	4822 126 12105	50V 33nF PM5
2108	4822 126 12105	50V 33nF PM5
2109	4822 126 12105	50V 33nF PM5
2110	4822 126 12105	50V 33nF PM5
2111	4822 126 12105	50V 33nF PM5
2114	5322 122 32658	22pF 5% 50V
2115	5322 122 32658	22pF 5% 50V
2116	4822 126 12105	50V 33nF PM5
2117	4822 124 81286	47µF 20% 16V
2118	5322 122 32658	22pF 5% 50V
2119	5322 122 32658	22pF 5% 50V
2121	5322 122 31647	1nF 10% 63V
2122	4822 126 12105	50V 33nF PM5
2123	4822 124 81286	47µF 20% 16V
2124	3198 028 52290	22µF 20% 50V
2125	5322 122 32658	22pF 5% 50V
2126	4822 124 11947	10µF 20% 16V
2127	4822 126 12105	50V 33nF PM5
2128	5322 122 31647	1nF 10% 63V
2129	3198 028 52290	22µF 20% 50V
2130	3198 028 52290	22µF 20% 50V
2131	3198 028 52290	22µF 20% 50V

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3100	4822 051 20223	22k 5% 0.1W
3101	4822 051 20273	27k 5% 0.1W
3102	4822 117 10834	47k 1% 0.1W
3103	4822 117 11149	82k 1% 0.1W
3104	4822 117 10837	100k 1% 0.1W
3106	4822 117 11503	220Ω 1% 0.1W
3108	4822 117 11149	82k 1% 0.1W
3109	4822 051 20472	4k7 5% 0.1W
3110	4822 051 20472	4k7 5% 0.1W
3111	4822 051 20472	4k7 5% 0.1W
3112	4822 051 20472	4k7 5% 0.1W
3113	4822 051 20472	4k7 5% 0.1W
3115	4822 051 20472	4k7 5% 0.1W
3116	4822 117 11149	82k 1% 0.1W
3117	4822 117 11152	4Ω7 5%
3118	4822 117 10833	10k 1% 0.1W
3119	4822 117 10833	10k 1% 0.1W
3120	4822 051 20471	470Ω 5% 0.1W
3121	4822 051 20472	4k7 5% 0.1W
3122	4822 051 20109	10Ω 5% 0.1W
3123	4822 117 10833	10k 1% 0.1W
3125	4822 051 20109	10Ω 5% 0.1W
3130	4822 051 20109	10Ω 5% 0.1W
3131	4822 117 11152	4Ω7 5%
3132	4822 117 13577	330Ω 1% RC12H 0805 1.25W
3133	4822 051 20109	10Ω 5% 0.1W
3134	4822 117 13577	330Ω 1% RC12H 0805 1.25W
3135	4822 117 11503	220Ω 1% 0.1W
3136	4822 051 10102	1k 2% 0.25W
3137	4822 117 10833	10k 1% 0.1W
3138	4822 051 20471	470Ω 5% 0.1W
3139	4822 051 20472	4k7 5% 0.1W
3140	4822 117 10833	10k 1% 0.1W
3142	4822 117 13577	330Ω 1% RC12H 0805 1.25W
3143	4822 117 10833	10k 1% 0.1W
3144	4822 117 10837	100k 1% 0.1W
3150	4822 051 20472	4k7 5% 0.1W
3160	4822 051 20101	100Ω 5% 0.1W
3999	4822 117 12842	

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6100	9322 154 46685	DIO REC SM RB501V-40 (RHM0) R
6101	4822 130 10837	UDZS8.2B
6102	3198 020 51090	DIO REG SM BZX384-C10 COL R
6104	4822 130 11397	BAS316
6160	4822 130 83059	TLUR4400

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7100	5322 130 60159	BC846B
7101	5322 130 60159	BC846B
7102	5322 130 60159	BC846B
7103	5322 130 60159	BC846B
7104	3104 123 94530	IC ROM SLAVE DVD950
7105	4822 130 40855	BC337
7106	4822 130 41246	BC327-25
7107	5322 130 60159	BC846B
7108	5322 130 60159	BC846B
7109	4822 130 60373	BC856B
7110	9322 155 22667	

7112	4822 209 31257	MC79L24ACP

Mono PWB

Various

1001	2422 025 16957	CON BM V 24P F 1.00 FFC 0.3 R
1104	2422 025 15963	CON BM H 24P F 0.50 FFC SMD R
1106	2422 025 16158	CON BM H 8P F 1.00 FFC 0.3 R
1205	2422 540 98428	RES CER SM 8M467 CSTCC8.46MHz R
1300	2422 540 98426	RES CER SM 6MHz CSTCC6.00MHz R
1301	4822 267 51454	CONN. 11P FEMALE
1603	2422 025 16389	CON BM V 22P F 1.00 FFC 0.3 R
1604	2422 025 16388	CON BM V 16P F 1.00 FFC 0.3 R

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2009	4822 126 14305	100nF 10% 16V 0603
2010	4822 126 14305	100nF 10% 16V 0603
2011	4822 126 14305	100nF 10% 16V 0603
2012	4822 126 14305	100nF 10% 16V 0603
2013	4822 126 14043	1µF 20% 16V CASE
2100	2222 780 15656	16V 330nF PM10 R
2101	4822 126 14305	100nF 10% 16V 0603
2103	4822 124 80151	47µF 16V
2104	4822 126 13193	4.7nF 10% 63V
2105	4822 122 33761	22pF 5% 50V
2107	4822 126 13956	68pF 5% 63V CASE 0603
2108	4822 126 14315	390pF 5% 50V 0603
2109	2020 552 95697	
2110	2222 861 15222	63V 2N2 PM5
2111	4822 126 14305	100nF 10% 16V 0603
2112	5322 126 11578	1nF 10% 50V 0603
2113	4822 126 14305	100nF 10% 16V 0603
2114	4822 122 31765	100pF 2% 63V
2115	4822 126 14305	100nF 10% 16V 0603
2116	4822 126 14305	100nF 10% 16V 0603
2117	4822 126 14305	100nF 10% 16V 0603
2118	3198 017 42230	0603 50V 22nF COL
2119	3198 017 42230	0603 50V 22nF COL
2120	4822 126 14305	100nF 10% 16V 0603
2121	4822 126 13879	220nF 20% 16V
2122	3198 017 42230	0603 50V 22nF COL
2123	4822 126 14305	100nF 10% 16V 0603
2124	4822 126 14305	100nF 10% 16V 0603
2125	4822 126 14305	100nF 10% 16V 0603
2126	4822 126 14305	100nF 10% 16V 0603
2127	4822 126 14305	100nF 10% 16V 0603
2128	4822 126 14508	180pF 5% 50V 0603
2129	4822 126 14508	180pF 5% 50V 0603
2130	4822 122 33761	22pF 5% 50V
2131	4822 126 14494	22nF 10% 25V 0603
2136	4822 126 14305	100nF 10% 16V 0603
2137	4822 126 14305	100nF 10% 16V 0603
2138	4822 126 14305	100nF 10% 16V 0603
2139	4822 126 14305	100nF 10% 16V 0603
2140	4822 126 14241	0603 50V 330P COL R
2141	4822 122 33761	22pF 5% 50V
2142	5322 126 11583	10nF 10% 50V 0603
2143	4822 126 13883	220pF 5% 50V
2144	4822 126 13883	220pF 5% 50V
2145	4822 126 13883	220pF 5% 50V
2146	4822 126 14305	100nF 10% 16V 0603
2147	4822 126 14305	100nF 10% 16V 0603
2200	4822 126 14494	22nF 10% 25V 0603
2201	4822 126 14494	22nF 10% 25V 0603
2202	4822 126 14494	22nF 10% 25V 0603
2203	4822 126 14305	100nF 10% 16V 0603
2204	4822 126 14305	100nF 10% 16V 0603
2205	4822 126 14305	100nF 10% 16V 0603
2206	4822 126 14549	33nF 16V O6O3
2207	5322 126 11578	1nF 10% 50V 0603
2208	4822 126 14305	100nF 10% 16V 0603
2209	4822 126 14305	100nF 10% 16V 0603
2210	5322 126 11578	1nF 10% 50V 0603
2212	4822 126 14305	100nF 10% 16V 0603
2213	4822 126 14305	100nF 10% 16V 0603
2214	3198 017 42230	0603 50V 22nF COL
2215	4822 124 23237	22µF 6.3V
2216	5322 126 11578	1nF 10% 50V 0603
2226	4822 126 14305	100nF 10% 16V 0603
2227	4822 126 14305	100nF 10% 16V 0603
2228	4822 126 14305	100nF 10% 16V 0603
2300	4822 126 14305	100nF 10% 16V 0603
2301	4822 126 14305	100nF 10% 16V 0603
2302	4822 126 14305	100nF 10% 16V 0603
2303	4822 124 80349	47µF 20% 6.3V
2304	3198 017 42230	0603 50V 22nF COL
2305	3198 017 42230	0603 50V 22nF COL
2306	4822 124 23002	10µF 16V
2307	3198 017 42230	0603 50V 22nF COL
2308	4822 126 14494	22nF 10% 25V 0603
2309	4822 126 14305	100nF 10% 16V 0603
2310	4822 126 14305	100nF 10% 16V 0603
2314	4822 126 14305	100nF 10% 16V 0603
2315	4822 126 14305	100nF 10% 16V 0603
2316	4822 126 14494	22nF 10% 25V 0603
2317	4822 126 14494	22nF 10% 25V 0603
2318	5322 122 33861	120pF 10% 50V
2319	4822 126 11669	27pF
2320	4822 126 14494	22nF 10% 25V 0603
2401	4822 126 14305	100nF 10% 16V 0603
2402	4822 126 14305	100nF 10% 16V 0603
2403	4822 126 14305	100nF 10% 16V 0603
2404	4822 126 14305	100nF 10% 16V 0603
2405	4822 126 14305	100nF 10% 16V 0603
2406	4822 126 14305	100nF 10% 16V 0603
2407	4822 126 14305	100nF 10% 16V 0603
2408	4822 126 14305	100nF 10% 16V 0603
2409	4822 126 14305	100nF 10% 16V 0603
2410	4822 126 14305	100nF 10% 16V 0603
2411	4822 126 14305	100nF 10% 16V 0603
2412	4822 126 14305	100nF 10% 16V 0603
2413	4822 126 14305	100nF 10% 16V 0603
2414	4822 126 14305	100nF 10% 16V 0603
2418	4822 124 12095	100µF 20% 16V
2419	4822 124 80349	47µF 20% 6.3V
2420	4822 124 80349	47µF 20% 6.3V
2452	4822 126 14305	100nF 10% 16V 0603
2454	4822 126 14305	100nF 10% 16V 0603
2455	4822 126 14305	100nF 10% 16V 0603
2457	4822 124 23002	10µF 16V
2458	4822 126 14305	100nF 10% 16V 0603
2458	4822 126 14583	470nF 10% 16V XTR
2459	4822 126 14043	1µF 20% 16V CASE
2460	4822 126 14583	470nF 10% 16V XTR
2461	4822 126 14583	470nF 10% 16V XTR
2500	4822 126 14305	100nF 10% 16V 0603
2504	4822 122 31765	100pF 2% 63V
2505	4822 126 14494	22nF 10% 25V 0603
2506	4822 124 23002	10µF 16V
2507	4822 126 14305	100nF 10% 16V 0603
2508	5322 126 11579	3.3nF 10% 63V
2509	4822 126 14241	0603 50V 330P COL R
2510	4822 126 14305	100nF 10% 16V 0603
2511	4822 126 14305	100nF 10% 16V 0603
2512	4822 126 14305	100nF 10% 16V 0603
2513	4822 126 14305	100nF 10% 16V 0603
2514	4822 126 14305	100nF 10% 16V 0603
2515	4822 126 14305	100nF 10% 16V 0603
2516	4822 126 14305	100nF 10% 16V 0603
2517	4822 126 14305	100nF 10% 16V 0603
2518	4822 126 14305	100nF 10% 16V 0603
2519	4822 126 14305	100nF 10% 16V 0603
2520	4822 126 14305	100nF 10% 16V 0603
2521	4822 126 14305	100nF 10% 16V 0603
2522	4822 126 14305	100nF 10% 16V 0603
2523	4822 126 14305	100nF 10% 16V 0603
2524	4822 126 14305	100nF 10% 16V 0603
2525	4822 126 14305	100nF 10% 16V 0603
2526	4822 126 14305	100nF 10% 16V 0603
2528	4822 126 14305	100nF 10% 16V 0603
2529	4822 126 14305	100nF 10% 16V 0603
2530	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2531	3198 030 74780	EL SM 35V 4U7 PM20 COL R
2532	4822 122 33777	47pF 5% 63V
2533	4822 122 33777	47pF 5% 63V
2534	5322 126 11578	1nF 10% 50V 0603
2535	5322 126 11578	1nF 10% 50V 0603
2600	4822 126 14494	22nF 10% 25V 0603
2601	4822 126 14247	0603 50V 1N5 COL R
2602	4822 126 14247	0603 50V 1N5 COL R
2603	4822 126 14305	100nF 10% 16V 0603
2604	4822 124 12095	100µF 20% 16V
2605	4822 126 14494	22nF 10% 25V 0603
2606	4822 124 12095	100µF 20% 16V
2607	4822 124 12095	100µF 20% 16V
2608	4822 124 23002	10µF 16V
2609	4822 124 80151	47µF 16V
2610	4822 126 14305	100nF 10% 16V 0603
2611	4822 124 12095	100µF 20% 16V
2614	4822 122 33777	47pF 5% 63V
2615	4822 122 33777	47pF 5% 63V
2616	4822 122 33777	47pF 5% 63V
2617	4822 122 33777	47pF 5% 63V
2620	4822 122 33777	47pF 5% 63V
2621	4822 122 33777	47pF 5% 63V
2622	4822 122 33777	47pF 5% 63V
2623	4822 122 33777	47pF 5% 63V
2624	4822 122 33777	47pF 5% 63V
2625	4822 122 33777	47pF 5% 63V
2626	4822 122 33777	47pF 5% 63V
2627	4822 122 33777	47pF 5% 63V
2632	4822 124 12095	100µF 20% 16V
2633	4822 124 12095	100µF 20% 16V
2634	4822 126 14305	100nF 10% 16V 0603
2635	4822 126 14305	100nF 10% 16V 0603
2636	4822 126 14305	100nF 10% 16V 0603
2637	4822 126 14305	100nF 10% 16V 0603
2638	4822 126 14305	100nF 10% 16V 0603
2639	4822 126 14305	100nF 10% 16V 0603
2646	4822 124 23002	10µF 16V
2647	4822 122 33777	47pF 5% 63V
2648	4822 122 33761	22pF 5% 50V
2649	4822 126 14305	100nF 10% 16V 0603
2650	4822 126 14305	100nF 10% 16V 0603
2700	4822 126 14305	100nF 10% 16V 0603
2701	4822 126 14305	100nF 10% 16V 0603
2702	4822 126 14305	100nF 10% 16V 0603
2703	4822 126 14305	100nF 10% 16V 0603
2704	4822 126 14305	100nF 10% 16V 0603
2705	4822 126 14305	100nF 10% 16V 0603
2706	4822 126 14305	100nF 10% 16V 0603
2707	4822 124 80349	47µF 20% 6.3V
2800	4822 124 23002	10µF 16V
2801	4822 124 23002	10µF 16V
2802	4822 126 14305	100nF 10% 16V 0603
2803	4822 126 14305	100nF 10% 16V 0603
2804	4822 126 14305	100nF 10% 16V 0603
2805	4822 126 14305	100nF 10% 16V 0603
2806	4822 126 14305	100nF 10% 16V 0603
2807	4822 126 14305	100nF 10% 16V 0603
2808	4822 126 14305	100nF 10% 16V 0603
2809	4822 126 14305	100nF 10% 16V 0603
2810	4822 126 14305	100nF 10% 16V 0603
2811	4822 126 14305	100nF 10% 16V 0603
2812	4822 126 14305	100nF 10% 16V 0603
2813	4822 126 14305	100nF 10% 16V 0603
2814	4822 126 14305	100nF 10% 16V 0603
2815	4822 126 14305	100nF 10% 16V 0603
2816	4822 126 14305	100nF 10% 16V 0603
2817	4822 126 14305	100nF 10% 16V 0603
2818	4822 126 14305	100nF 10% 16V 0603
2819	4822 126 14305	100nF 10% 16V 0603
2820	4822 126 14305	100nF 10% 16V 0603
2821	4822 126 14305	100nF 10% 16V 0603
2822	4822 126 14305	100nF 10% 16V 0603
2823	4822 124 23002	10µF 16V
2824	4822 126 14305	100nF 10% 16V 0603
2825	4822 124 23002	10µF 16V
2826	4822 126 14305	100nF 10% 16V 0603
2827	5322 126 11583	10nF 10% 50V 0603
2828	4822 126 14225	56pF 5% 50V 0603
2829	4822 126 14305	100nF 10% 16V 0603
2830	4822 126 14305	100nF 10% 16V 0603
2831	4822 126 14305	100nF 10% 16V 0603
2832	4822 126 14238	0603 50V 2N2 COL R
2833	5322 126 11583	10nF 10% 50V 0603
2834	4822 126 14305	100nF 10% 16V 0603
2901	4822 126 14305	100nF 10% 16V 0603
2901	5322 126 11583	10nF 10% 50V 0603
2902	4822 126 14305	100nF 10% 16V 0603
2903	4822 126 14305	100nF 10% 16V 0603
2905	4822 126 14305	100nF 10% 16V 0603
2906	4822 122 33761	22pF 5% 50V
2907	4822 122 33761	22pF 5% 50V

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3000	4822 051 30339	33Ω 5% 0.062W
3001	4822 051 30339	33Ω 5% 0.062W
3002	4822 051 30339	33Ω 5% 0.062W
3003	4822 051 30103	10k 5% 0.062W
3004	4822 051 30339	33Ω 5% 0.062W
3005	4822 051 30339	33Ω 5% 0.062W
3006	4822 051 30339	33Ω 5% 0.062W
3007	4822 051 30339	33Ω 5% 0.062W
3008	4822 051 30339	33Ω 5% 0.062W
3009	4822 051 30339	33Ω 5% 0.062W
3010	4822 117 12925	47k 1% 0.063W 0603
3011	4822 051 30339	33Ω 5% 0.062W
3012	4822 051 30472	4k7 5% 0.062W
3013	4822 051 30103	10k 5% 0.062W
3014	4822 051 30103	10K 5% 0.062W
3015	4822 051 30332	3k3 5% 0.062W
3016	4822 051 30103	10k 5% 0.062W
3017	4822 051 30103	10k 5% 0.062W
3018	4822 117 12925	47k 1% 0.063W 0603
3019	4822 051 30103	10k 5% 0.062W
3020	4822 051 30339	33Ω 5% 0.062W
3021	4822 051 30472	4k7 5% 0.062W
3022	4822 051 30472	4k7 5% 0.062W
3023	4822 051 30103	10k 5% 0.062W
3024	4822 051 30222	2k2 5% 0.062W
3025	4822 051 30103	10k 5% 0.062W
3026	4822 051 30103	10k 5% 0.062W
3027	4822 051 30103	10k 5% 0.062W
3028	4822 051 30103	10k 5% 0.062W
3029	4822 051 30472	4k7 5% 0.062W
3030	4822 051 30332	3k3 5% 0.062W
3031	4822 051 30103	10k 5% 0.062W
3033	4822 051 30102	1k 5% 0.062W
3100	4822 117 11152	4Ω7 5%
3102	5322 117 13034	1k5 1% 0.063W 0603 RC22H
3103	5322 117 13034	1k5 1% 0.063W 0603 RC22H
3104	5322 117 13062	390Ω 1% 0.063W 0603 RC22H
3105	4822 051 30103	10k 5% 0.062W
3106	4822 051 30479	47Ω 5% 0.062W
3107	4822 051 20228	2Ω2 5% 0.1W
3108	4822 051 20228	2Ω2 5% 0.1W
3109	4822 117 13632	100k 1% 0603 0.62W
3110	4822 051 30479	47Ω 5% 0.062W
3111	5322 117 13058	150Ω 1% 0.063W 0603 RC22H
3112	5322 117 13021	47Ω 1% 0.063W 0603 RC22H
3114	4822 051 20228	2Ω2 5% 0.1W
3115	4822 051 20228	2Ω2 5% 0.1W
3116	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3117	4822 051 30181	180Ω 5% 0.062W
3118	4822 051 30681	680Ω 5% 0.062W
3119	5322 117 13062	390Ω 1% 0.063W 0603 RC22H
3120	4822 051 30102	1k 5% 0.062W
3121	4822 051 30273	27k 5% 0.062W
3122	4822 051 30471	470Ω 5% 0.062W
3123	4822 051 30103	10k 5% 0.062W
3124	4822 051 30471	470Ω 5% 0.062W
3125	4822 051 30103	10k 5% 0.062W
3126	4822 051 30103	10k 5% 0.062W
3127	4822 051 30223	22k 5% 0.062W
3128	2322 704 69109	
3129	4822 051 30392	3k9 5% 0.063W 0603
3130	4822 051 20228	2Ω2 5% 0.1W
3131	4822 051 20228	2Ω2 5% 0.1W
3132	4822 051 20228	2Ω2 5% 0.1W
3133	4822 051 20228	2Ω2 5% 0.1W
3134	5322 117 13047	330Ω 1% 0.063W 0603 RC22H
3135	4822 117 13613	2Ω2 5% 0603
3137	4822 117 13613	2Ω2 5% 0603
3138	5322 117 13053	6k8 1% 0.063W 0603 RC22H
3139	4822 117 12917	1Ω 5% 0.062W CASE0603
3140	4822 051 30479	47Ω 5% 0.062W
3141	4822 117 11152	4Ω7 5%
3142	5322 117 13028	12k 1% 0.063W 0603 RC22H
3143	5322 117 13043	220Ω 1% 0.063W 0603 RC22H
3144	2322 704 69109	
3146	4822 051 30103	10k 5% 0.062W
3147	4822 051 30103	10k 5% 0.062W
3148	5322 117 13022	22k 1% 0.063W 0603 RC22H
3153	4822 117 12139	22Ω 5% 0.062W
3155	4822 051 30103	10k 5% 0.062W
3157	4822 051 30103	10k 5% 0.062W
3158	5322 117 13017	100Ω 1% 0.063W 0603 RC22H
3160	4822 051 30101	100Ω 5% 0.062W
3161	4822 117 13613	2Ω2 5% 0603
3162	4822 051 30101	100Ω 5% 0.062W
3163	4822 051 30273	27k 5% 0.062W
3164	4822 117 13613	2Ω2 5% 0603
3165	5322 117 13063	120Ω 1% 0.063W 0603 RC22H
3166	4822 051 30393	39k 5% 0.062W
3167	4822 051 30101	100Ω 5% 0.062W
3168	5322 117 13047	330Ω 1% 0.063W 0603 RC22H
3169	4822 051 30101	100Ω 5% 0.062W
3170	4822 051 30101	100Ω 5% 0.062W
3171	4822 051 30101	100Ω 5% 0.062W
3172	4822 117 13632	100k 1% 0603 0.62W
3173	4822 117 13632	100k 1% 0603 0.62W
3174	4822 117 11152	4Ω7 5%
3175	4822 117 13613	2Ω2 5% 0603
3176	4822 051 30153	15k 5% 0.062W
3178	4822 117 11151	1Ω 5%
3179	4822 051 30221	220Ω 5% 0.062W
3180	4822 117 13632	100k 1% 0603 0.62W
3181	4822 051 30561	560Ω 5% 0.062W
3182	5322 117 13018	1k0 1% 0.063W 0603 RC22H
3183	5322 117 13017	100Ω 1% 0.063W 0603 RC22H
3184	2322 704 61204	
3185	4822 117 11151	1Ω 5%
3187	4822 051 30273	27k 5% 0.062W
3189	4822 051 30008	0Ω jumper
3190	4822 051 30008	0Ω jumper
3191	4822 051 30008	0Ω jumper
3192	4822 051 30008	0Ω jumper
3193	4822 051 30008	0Ω jumper
3194	4822 051 30008	0Ω jumper
3195	4822 051 30008	0Ω jumper
3197	4822 051 30008	0Ω jumper
3198	5322 117 13049	470Ω 1% 0.063W 0603 RC22H
3199	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3200	4822 051 30103	10k 5% 0.062W
3201	4822 117 11151	1Ω 5%
3202	4822 117 11151	1Ω 5%
3203	4822 051 30105	1M 5% 0.062W
3204	4822 051 30331	330Ω 5% 0.062W
3205	4822 051 30103	10k 5% 0.062W
3206	4822 051 30103	10k 5% 0.062W
3207	4822 051 30472	4k7 5% 0.062W
3208	4822 051 30272	2k7 5% 0.062W
3209	4822 051 30472	4k7 5% 0.062W
3210	4822 051 30392	3k9 5% 0.063W 0603
3211	4822 051 30472	4k7 5% 0.062W
3212	4822 117 11152	4Ω7 5%
3213	4822 117 11152	4Ω7 5%
3214	4822 051 30392	3k9 5% 0.063W 0603
3215	4822 051 30103	10k 5% 0.062W
3216	4822 051 30472	4k7 5% 0.062W
3219	4822 051 30103	10k 5% 0.062W
3220	4822 051 30103	10k 5% 0.062W
3221	4822 051 30103	10k 5% 0.062W
3224	4822 051 30151	150Ω 5% 0.062W
3225	2322 704 62004	
3226	4822 051 30103	10k 5% 0.062W
3227	4822 051 30472	4k7 5% 0.062W
3229	4822 051 30123	12k 5% 0.062W
3230	4822 051 30103	10k 5% 0.062W
3231	4822 051 30103	10k 5% 0.062W
3232	4822 117 13613	2Ω2 5% 0603
3233	4822 051 30102	1k 5% 0.062W
3234	4822 117 12902	8k2 1% 0.063W 0603
3235	4822 117 13632	100k 1% 0603 0.62W
3236	4822 051 30472	4k7 5% 0.062W
3237	4822 051 30103	10k 5% 0.062W
3238	4822 051 30103	10k 5% 0.062W
3239	4822 051 30008	0Ω jumper
3240	4822 051 30103	10k 5% 0.062W
3242	4822 051 30008	0Ω jumper
3243	4822 051 30008	0Ω jumper
3246	4822 051 30008	0Ω jumper
3247	4822 051 30008	0Ω jumper
3249	4822 051 30008	0Ω jumper
3250	4822 051 30008	0Ω jumper
3251	4822 051 30008	0Ω jumper
3252	4822 051 30008	0Ω jumper
3253	4822 051 30008	0Ω jumper
3254	4822 051 30008	0Ω jumper
3255	4822 051 30008	0Ω jumper
3256	4822 051 30008	0Ω jumper
3257	4822 051 30008	0Ω jumper
3258	4822 051 30008	0Ω jumper
3259	4822 117 11151	1Ω 5%
3260	4822 117 11151	1Ω 5%
3300	4822 117 11152	4Ω7 5%
3301	4822 051 30105	1M 5% 0.062W
3302	4822 051 30221	220Ω 5% 0.062W
3304	4822 051 30272	2k7 5% 0.062W
3305	4822 051 30272	2k7 5% 0.062W
3309	4822 051 30103	10k 5% 0.062W
3310	4822 051 30223	22k 5% 0.062W
3311	4822 051 30223	22k 5% 0.062W
3312	4822 051 30472	4k7 5% 0.062W
3313	4822 051 30472	4k7 5% 0.062W
3316	4822 051 20108	1Ω 5% 0.1W
3317	4822 051 20108	1Ω 5% 0.1W
3318	4822 051 30472	4k7 5% 0.062W
3319	4822 051 30479	47Ω 5% 0.062W
3320	4822 051 30472	4k7 5% 0.062W
3321	4822 051 30682	6k8 5% 0.062W
3322	5322 117 13026	4k7 1% 0.063W 0603 RC22H
3323	5322 117 13026	4k7 1% 0.063W 0603 RC22H
3324	4822 117 13632	100k 1% 0603 0.62W
3325	4822 051 30682	6k8 5% 0.062W
3326	4822 051 30479	47Ω 5% 0.062W
3327	4822 051 30682	6k8 5% 0.062W
3328	4822 051 30223	22k 5% 0.062W
3329	4822 051 30223	22k 5% 0.062W
3330	4822 051 30223	22k 5% 0.062W
3331	4822 051 30332	3k3 5% 0.062W
3332	4822 051 30332	3k3 5% 0.062W
3333	4822 051 30101	100Ω 5% 0.062W
3334	4822 051 30101	100Ω 5% 0.062W
3335	4822 051 30101	100Ω 5% 0.062W
3336	4822 051 30339	33Ω 5% 0.062W
3337	4822 051 30339	33Ω 5% 0.062W
3338	4822 051 30101	100Ω 5% 0.062W
3339	4822 051 30008	0Ω jumper
3340	4822 051 30008	0Ω jumper
3403	4822 051 30103	10k 5% 0.062W
3404	4822 051 30103	10k 5% 0.062W
3450	4822 051 30103	10k 5% 0.062W
3451	4822 117 13632	100k 1% 0603 0.62W
3452	4822 051 30223	22k 5% 0.062W
3453	4822 051 30222	2k2 5% 0.062W
3454	4822 051 30223	22k 5% 0.062W
3455	4822 051 30223	22k 5% 0.062W
3455	4822 117 13632	100k 1% 0603 0.62W
3456	4822 051 30103	10k 5% 0.062W
3457	4822 051 30103	10k 5% 0.062W
3458	4822 051 30223	22k 5% 0.062W
3459	4822 051 30223	22k 5% 0.062W
3460	4822 051 30472	4k7 5% 0.062W
3500	4822 051 30332	3k3 5% 0.062W
3501	4822 051 30332	3k3 5% 0.062W
3502	4822 051 30103	10k 5% 0.062W
3503	4822 051 30103	10k 5% 0.062W
3504	4822 051 30103	10k 5% 0.062W
3505	4822 051 30103	10k 5% 0.062W
3506	4822 051 30103	10k 5% 0.062W
3508	4822 051 30689	68Ω 5% 0.063W 0603 RC21 RST SM
3509	4822 051 30103	10k 5% 0.062W
3511	4822 051 30332	3k3 5% 0.062W
3512	4822 051 30332	3k3 5% 0.062W
3513	4822 051 30103	10k 5% 0.062W
3514	4822 051 30103	10k 5% 0.062W
3515	4822 051 30103	10k 5% 0.062W
3516	4822 051 30103	10k 5% 0.062W
3517	4822 051 30332	3k3 5% 0.062W
3519	4822 051 30103	10k 5% 0.062W
3520	4822 051 30103	10k 5% 0.062W
3521	4822 051 30103	10k 5% 0.062W
3522	4822 051 30103	10k 5% 0.062W
3523	4822 051 30332	3k3 5% 0.062W
3524	4822 051 30101	100Ω 5% 0.062W
3525	4822 051 30103	10k 5% 0.062W
3526	4822 051 30103	10k 5% 0.062W
3534	4822 051 30103	10k 5% 0.062W
3535	4822 051 30153	15k 5% 0.062W
3537	4822 051 30331	330Ω 5% 0.062W
3538	4822 051 30681	680Ω 5% 0.062W
3541	4822 051 30479	47Ω 5% 0.062W
3542	4822 051 30479	47Ω 5% 0.062W
3545	4822 051 30221	220Ω 5% 0.062W
3546	4822 051 30101	100Ω 5% 0.062W
3548	4822 051 30008	0Ω jumper
3550	4822 051 30101	100Ω 5% 0.062W
3551	4822 051 30101	100Ω 5% 0.062W
3564	4822 051 30008	0Ω jumper
3570	4822 051 30101	100Ω 5% 0.062W
3571	4822 051 30689	68Ω 5% 0.063W 0603 RC21 RST SM
3572	4822 051 30689	68Ω 5% 0.063W 0603 RC21 RST SM
3605	4822 051 30008	0Ω jumper
3606	4822 117 12925	47k 1% 0.063W 0603
3607	4822 117 13632	100k 1% 0603 0.62W
3608	4822 117 13632	100k 1% 0603 0.62W
3609	4822 117 13632	100k 1% 0603 0.62W
3610	4822 051 30103	10k 5% 0.062W
3611	4822 051 30103	10k 5% 0.062W
3612	4822 051 30103	10k 5% 0.062W
3613	4822 051 30103	10k 5% 0.062W
3614	4822 051 30103	10k 5% 0.062W
3615	4822 051 30103	10k 5% 0.062W
3616	4822 051 30103	10k 5% 0.062W
3618	4822 051 30223	22k 5% 0.062W
3619	4822 051 30223	22k 5% 0.062W
3620	4822 051 30101	100Ω 5% 0.062W
3621	4822 051 30101	100Ω 5% 0.062W
3622	4822 051 30101	100Ω 5% 0.062W
3623	4822 051 30339	33Ω 5% 0.062W
3624	4822 051 30339	33Ω 5% 0.062W

3625	4822 051 30339	33Ω 5% 0.062W
3626	4822 051 30102	1k 5% 0.062W
3627	4822 051 30471	470Ω 5% 0.062W
3628	4822 051 30471	470Ω 5% 0.062W
3629	4822 051 30472	4k7 5% 0.062W
3630	4822 051 30221	220Ω 5% 0.062W
3631	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3632	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3633	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3635	4822 051 30682	6k8 5% 0.062W
3636	4822 051 30682	6k8 5% 0.062W
3637	4822 051 30332	3k3 5% 0.062W
3642	4822 051 30103	10k 5% 0.062W
3647	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3648	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3651	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3654	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3655	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3656	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3657	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3658	4822 051 30102	1k 5% 0.062W
3659	4822 051 30102	1k 5% 0.062W
3660	4822 051 30102	1k 5% 0.062W
3661	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3662	4822 051 30102	1k 5% 0.062W
3663	4822 051 30102	1k 5% 0.062W
3664	2322 704 64301	RST SM 0603 RC22H 430Ω PM1 R
3665	4822 117 12139	22Ω 5% 0.062W
3667	4822 051 30339	33Ω 5% 0.062W
3672	4822 051 30479	47Ω 5% 0.062W
3686	4822 051 30223	22k 5% 0.062W
3687	4822 051 30223	22k 5% 0.062W
3688	4822 051 30472	4k7 5% 0.062W
3689	4822 051 30223	22k 5% 0.062W
3691	4822 051 30339	33Ω 5% 0.062W
3702	4822 051 30102	1k 5% 0.062W
3800	4822 051 30479	47Ω 5% 0.062W
3801	4822 051 30339	33Ω 5% 0.062W
3802	4822 051 30331	330Ω 5% 0.062W
3805	4822 051 30479	47Ω 5% 0.062W
3806	4822 051 30153	15k 5% 0.062W
3807	4822 051 30682	6k8 5% 0.062W
3808	4822 051 30332	3k3 5% 0.062W
3809	4822 051 30332	3k3 5% 0.062W
3810	4822 051 30332	3k3 5% 0.062W
3811	4822 051 30332	3k3 5% 0.062W
3812	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3813	5322 117 13042	3k9 1% 0.063W 0603 RC22H
3814	4822 051 30181	180Ω 5% 0.062W
3814	4822 051 30339	33Ω 5% 0.062W
3816	4822 051 30101	100Ω 5% 0.062W
3900	4822 051 30103	10k 5% 0.062W
3901	4822 051 30103	10k 5% 0.062W
3902	4822 051 30339	33Ω 5% 0.062W
3903	4822 051 30339	33Ω 5% 0.062W
3904	4822 051 30331	330Ω 5% 0.062W
3904	4822 051 30339	33Ω 5% 0.062W
3905	4822 051 30221	220Ω 5% 0.062W
3906	4822 051 30339	33Ω 5% 0.062W
3907	2322 704 65609	RST SM 0603 RC22H 56Ω PM1 R
3907	4822 051 30339	33Ω 5% 0.062W
3908	4822 051 30339	33Ω 5% 0.062W
3908	4822 051 30479	47Ω 5% 0.062W
3909	4822 051 30332	3k3 5% 0.062W
3910	2322 704 65609	RST SM 0603 RC22H 56Ω PM1 R

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5000	4822 157 11717	BLM31P500SPT
5200	4822 157 11717	BLM31P500SPT
5300	4822 157 11717	BLM31P500SPT
5301	4822 157 11717	BLM31P500SPT
5402	4822 157 11717	BLM31P500SPT
5403	4822 157 11499	BLM11P600SPT
5450	4822 157 11717	BLM31P500SPT
5501	4822 157 70299	2.2μH (NL322522T-2R2J)
5502	4822 157 70299	2.2μH (NL322522T-2R2J)
5503	4822 157 71206	BLM21A601SPT
5504	4822 157 71206	BLM21A601SPT
5600	4822 157 71206	BLM21A601SPT
5601	4822 157 11499	BLM11P600SPT
5602	4822 157 10547	15μH 5%
5604	4822 157 10547	15μH 5%
5605	4822 157 10547	15μH 5%
5606	4822 157 10547	15μH 5%
5607	4822 157 10547	15μH 5%
5608	4822 157 10547	15μH 5%
5609	4822 157 11717	BLM31P500SPT
5610	4822 157 11717	BLM31P500SPT
5611	4822 157 11717	BLM31P500SPT
5700	4822 157 11717	BLM31P500SPT
5800	4822 157 11717	BLM31P500SPT
5801	4822 157 11717	BLM31P500SPT
5802	4822 157 11717	BLM31P500SPT
5900	4822 157 11717	BLM31P500SPT
5901	4822 157 11717	BLM31P500SPT
5902	4822 157 11717	BLM31P500SPT
5903	4822 157 11717	BLM31P500SPT

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6200	4822 130 11397	BAS316
6301	9322 128 69685	S1D
6302	9322 128 69685	S1D
6303	9322 128 69685	S1D
6600	4822 130 11528	1PS76SB10

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7000	9337 144 60118	IC SM 74HCT4066D (PHSE) R
7001	4822 130 60373	BC856B
7002	5322 130 60159	BC846B
7003	5322 130 60159	BC846B
7004	5322 130 60159	BC846B
7005	5322 130 60159	BC846B
7006	5322 130 60159	BC846B
7007	5322 130 60159	BC846B
7100	5322 130 42718	BFS20
7101	5322 130 42718	BFS20
7102	9352 637 37518	TZA1033HL
7103	4822 209 17229	BA5938FM
7104	4822 209 30095	LM833D
7105	4822 209 32073	MC34072D
7106	5322 130 42718	BFS20
7107	4822 209 33411	MC78L05ACD
7108	5322 130 60845	BC807-25
7109	4822 209 15083	AN78M09
7110	5322 130 60803	BST72A
7111	5322 130 60159	BC846B
7112	5322 130 60159	BC846B
7113	5322 130 60159	BC846B
7114	5322 130 60159	BC846B
7115	4822 130 60373	BC856B
7116	5322 130 60159	BC846B
7117	4822 130 42804	BC817-25
7201	9351 869 80118	
7202	3104 123 85860	AM29F002T/4.3.13
7203	4822 130 60373	BC856B
7204	9322 139 67685	IC SM MC33464N-45A (MOTA) R
7207	9352 636 60557	SAA7399HL/M2A
7304	4822 209 16877	BA6856FP
7310	4822 209 15899	CY7C199-15C
7311	9352 637 83557	IC SM SAA7335HL/E/M2 (PHSE) Y
7312	4822 130 60373	BC856B
7315	5322 130 60159	BC846B
7400	9352 499 60118	IC SM 74LVC00AD (PHSE) R
7404	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7405	9322 144 59668	IC SM MT48LC1M16A1TG-7S (MRN)R
7452	5322 130 60159	BC846B
7453	5322 130 60159	BC846B
7454	5322 130 60159	BC846B
7455	4822 130 60373	BC856B
7503	9322 151 16671	STI5505AVC
7505	4822 209 17377	M24C32-WMN6/PROG
7505	8204 056 05580	M24C32-WMN6TNKSA
7600	5322 209 71568	PC74HCT14T
7604	5322 130 60159	BC846B
7605	4822 209 17398	LD1117DT33
7607	5322 130 60159	BC846B
7608	4822 130 60373	BC856B
7609	4822 130 60373	BC856B
7610	5322 130 60159	BC846B
7611	9352 456 80115	
7612	5322 130 60159	BC846B
7613	5322 130 60159	BC846B
7614	5322 130 60159	BC846B
7615	5322 130 60159	BC846B
7617	5322 130 60159	BC846B
7618	5322 130 60159	BC846B
7620	4822 130 60373	BC856B
7621	4822 130 42804	BC817-25
7622	4822 209 17398	LD1117DT33
7700	9322 144 96668	IC SM MT48LC4M16A2TG-8E (MRN)R
7800	9352 680 19557	SAA7331HL/M1
7801	5322 130 42718	BFS20
7802	9352 611 78118	74HC1GU04GW
7900	4822 209 90752	74HCT04D
7902	9322 153 36668	IC SM ICS302M-3 (ICSI) R
7903	9322 151 72668	IC SM ICS601M-01T (MICL) R
7905	9322 151 71668	IC SM MK2703STR (MICL) R

DVD1000/171

Various

0001	3104 127 11490	FRONT AL ASSY
0002	3104 127 12140	FRONT ASSY
0004	3104 127 12880	WINDOW ASSY
0006	3104 127 12150	HOLDER RIGHT COMPLETE
0007	3104 127 12270	POWER ON/OFF KNOB ASSY
0012	3104 127 12160	HOLDER LEFT ASSY
0050	3104 120 00260	SA-CD BADGE
0065	3104 127 11520	TRAY FRONT COMPLETE SA-CD1000
0075	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0076	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0077	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0078	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0081	9305 023 61101	
0081	9305 023 61102	VAL6011/02
0086	3104 126 25210	DUST CAP
0151	3104 127 11930	COVER ASSY
0251	3104 127 10740	FOOT SILVER ASSY
0252	3104 127 10740	FOOT SILVER ASSY
0253	3104 127 10740	FOOT SILVER ASSY
0254	3104 127 10740	FOOT SILVER ASSY
0301	3104 128 92810	MAINSCORD US CLASS 1 NO GROUND
0309	3104 125 23800	USER MANUAL SACD USA (4-LANG)
0316	3104 128 92490	VIDEO CORD SET GOLD PLATED
0318	3104 207 10850	IRT PROD ASSY RC2055/01 PACKED
0320	4822 321 22611	
0321	4822 321 22611	
0322	4822 321 22611	
0323	4822 321 22611	
0324	4822 321 61452	
0326	3104 128 92770	GOLD PLATED YUV-CINCH CABLE
0370	4822 321 61849	
1002	3104 128 06870	MONOBOARD 4285 ASSY SACD1000
1003	3139 248 80720	PCBAS AV DVD711 SACD
1004	3104 129 22150	PSU SACD1000 SRV1122WW MITSUMI
1007	3104 128 70230	TRAFO ASSY SACD NUVOTEM
8003	3104 157 11860	CWAS FLEX SACD 24 108 32S
8006	3104 157 11960	CWAS FLEX DVD 22 180 32S
8007	3104 157 11950	CWAS FLEX DVD 16 180 32S

SACD1000/691

Various

0001	3104 127 11490	FRONT AL ASSY
0002	3104 127 12140	FRONT ASSY
0004	3104 127 12880	WINDOW ASSY
0006	3104 127 12150	HOLDER RIGHT COMPLETE
0007	3104 127 12270	POWER ON/OFF KNOB ASSY
0010	3104 124 05450	LIGHT CONDUCTOR
0012	3104 127 12160	HOLDER LEFT ASSY
0050	3104 120 00260	SA-CD BADGE
0065	3104 127 11520	TRAY FRONT COMPLETE SA-CD1000
0075	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0076	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0077	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0078	3104 118 90180	TAPTITE SCREW TORX + SPIKES
0081	9305 023 61101	
0086	3104 126 25210	DUST CAP
0151	3104 127 11930	COVER ASSY
0251	3104 127 10740	FOOT SILVER ASSY
0252	3104 127 10740	FOOT SILVER ASSY
0253	3104 127 10740	FOOT SILVER ASSY
0254	3104 127 10740	FOOT SILVER ASSY
0301	3104 128 92800	MAINSCORD EU CLASS 1 NO GROUND
0309	3104 125 23800	USER MANUAL SACD USA (4-LANG)
0316	3104 128 92490	VIDEO CORD SET GOLD PLATED
0318	3104 207 10850	IRT PROD ASSY RC2055/01 PACKED
0320	4822 321 22611	
0321	4822 321 22611	
0322	4822 321 22611	
0323	4822 321 22611	
0324	4822 321 61452	
0326	3104 128 92770	GOLD PLATED YUV-CINCH CABLE
0370	4822 321 61849	
1002	3104 128 06870	MONOBOARD 4285 ASSY SACD1000
1003	3139 248 80720	PCBAS AV DVD711 SACD
1004	3104 129 22150	PSU SACD1000 SRV1122WW MITSUMI
1007	3104 128 70230	TRAFO ASSY SACD NUVOTEM
8003	3104 157 11860	CWAS FLEX SACD 24 108 32S
8006	3104 157 11960	CWAS FLEX DVD 22 180 32S
8007	3104 157 11950	CWAS FLEX DVD 16 180 32S